Sustainability of Reforestation Projects in Kodera and Wire Forests in Rachuonyo South Sub-County, Homa Bay County – Kenya

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Abstract: **Despite substantial financial investment on reforestation projects, they fail to realize their fundamental goal of biodiversity conservation, carbon emission reduction, and support to livelihoods, leading to wastage of funds. The research was focused on determining the factors influencing the sustainability of reforestation projects in Kenya, focusing on Kodera and Wire forests in Rachuonyo South Sub-County in Homa Bay County. The objectives were; to assess the influence of public participation on the sustainability of reforestation projects, to assess the influence the economic benefits on the sustainability of reforestation projects, to evaluate the influence of government policy on the sustainability of reforestation projects, and to assess the influence of community awareness on the sustainability of reforestation projects in Kodera and Wire forests. Consequently, the study sought to fill the knowledge gap on the factors influencing the sustainability of reforestation projects in Kodera and Wire Forests. The theories of participation and conservation guided the study. It adopted a descriptive design. Through stratified and simple random sampling, 92 respondents were selected from a target population of 920. The collection of quantitative data was done using closed-ended questionnaires. Validity was enhanced through piloting, while reliability was enhanced through the split-half method. The quantitative data was measured in an interval scale, coded, and fed into the SPSS for analysis. Inferential and descriptive statistics were used to analyze data. Tables were used to present the data. There was a statistically significant relationship between public participation, economic benefits, government policy, and community awareness and the sustainability of reforestation projects (P-value < 0.05 = 0.001843785, 0.009802, 0.040775, and 0.000692 at 95% confidence level respectively). The study concluded that public participation, economic benefits, government policy, and community awareness have a significant influence on the sustainability of reforestation projects. Project implementers should enhance public participation, community awareness, and provide economic benefits to local communities. Government policies on projects should focus on the community and promote equality. Further research should be done to assess the influence of politics, income levels, literacy levels, and tree species on the sustainability of reforestation projects.**

Key Words: **Sustainability of Reforestation Projects**

I. INTRODUCTION

Forest degradation continues to be a global problem affecting millions of lives. The International Union for Conservation of Nature (IUCN) (2020) records that deforestation and degradation of forests have affected the lives of 1.6 billion people globally who rely on woodlands for their survival. Out of the 1.6 billion people who derive their livelihoods from forests, one billion make up the world's poorest (IUCN, 2020). Deforestation occurs when forests are converted to non-forest uses like agriculture and road construction. Forest degradation occurs when forest ecosystems become unable to provide important services and goods to nature and people (IUCN, 2020). More than half of the forests in the tropics have been lost since the 1960s, and every second, one hector of tropical forests is degraded. Degradation is not limited to only tropical forests, in Europe; more than 3.7 million hectors of forest land have been lost through destruction by human activities, forest fires, diseases, insects, and livestock (IUCN, 2020).

Forests are essential for biodiversity protection, sustainable livelihoods, and climate mitigation and adaptation. More than 80% of the global biodiversity is found in the forests (IUCN, 2020). Forests loss threatens the survival of thousands of plant and animal species. It limits the ability of forests to provide important services like fertile soil for agriculture and clean water and air. Deforestation poses a real threat to the lives of poor people who depend on the forests for survival. For instance, 52% of all agricultural land is severely destroyed through soil erosion, which occurs when trees are cleared. This causes food insecurity. Globally, forests take in over 2.4 billion tons of carbon dioxide that originates from the combustion of fossil fuels (IUCN, 2020). Destruction of forests further releases substantial amounts of carbon into the atmosphere, further compounding the problem of climate change. Protecting and restoring forests, which are important carbon sinks, can help in mitigating climate change. They also play a vital role in enhancing programs designed to combat climate. They are food safety nets in the event of climate shocks, minimize risks associated with disasters like the flooding of coastal areas, and help regulate water flows and microclimates. Enhancing the health of forest ecosystems and introducing sustainable reforestation projects enhances humans and natural systems ability to withstand climate change (IUCN, 2020).

Reforestation projects like Forest Landscape Restoration (FLR) by the IUCN and the United Nations' Billion Trees Campaign can help nations mitigate the effects of degradation and deforestation and resuscitate the economic, ecological,

climatic, and social, significance of forests. Yet, the sustainability of these reforestation projects continues to be the greatest challenge to many nations (Cao et al., 2010). For instance, the government of China invested billions of dollars in several reforestation projects like the Grain for Green and the Three North Shelter projects to solve forest degradation. Despite the massive financial investment, these projects have proved to be ecologically unsustainable. Most of the trees planted either died or are dying now (Cao et al., 2010). In their research, Cao et al. (2010) concluded that poor government policies on reforestation could have been the major cause of the unsustainability of the reforestation projects in China.

China holds about 5% of the global forest cover; hence challenges of sustainability of its reforestation projects have a significant global impact. According to De Li et al. (2013), China has invested $47.82 in its reforestation programs since 1999, yet these projects remain unsustainable. The Sloping Land Conversion Project is one example of those projects, and it is also the largest reforestation project globally. Assessment of the project by De Li et al. (2013) in Hainan Island in China showed that its implementation produced adverse effects on natural forests in the area. The study established that pulpwood and rubber plantations had replaced natural forests. Grasslands, shrubs, and natural forests decreased by 65%, with natural forests losing the most significant land at 21,063 hectares. The project converted a more substantial part of the natural forest into rubber and pulpwood plantations. The authors concluded that replacing natural forests could lead to higher carbon emissions (De Li et al., 2013)

Deforestation rate in Africa is twice that of the global average, with more than 4 million hectares of forest lost annually. For instance, reports indicate that Ghana had lost 23% of its 715,500 hectares of the original forest land through human actions like illegal logging. Deforestation contributes around 6-17% of the total carbon dioxide emission through anthropogenic sources (Appiah, Fagg & Pappinen, 2015). In 1992, the Convention for Biological Diversity (CBD) and the United Nations Framework Convention for Climate Change (UNFCCC) were signed. This led to the development of Reducing Emission from Deforestation and Degradation Plus (REDD+) projects aimed at reducing carbon emissions through reforestation initiatives. However, major donors like the African Development Bank and World Bank continue to doubt the sustainability of such projects, which are normally implemented on huge costs. Implementation of these projects, mostly in Africa, usually starts well, but sustaining them becomes difficult.

Consequently, many reforestation projects in Africa fail to realize their fundamental goal of biodiversity conservation, carbon emission reduction, and enhanced forest governance (Appiah, Fagg & Pappinen, 2015). This implies that while implementers of reforestation projects incur a significant amount of money, lack of sustainability hinders them from benefiting from these projects' returns. Lack of sustainability

of these projects is attributed to insufficient legal frameworks for shared equitable benefits and joint-management, resulting in social conflicts, inadequate participatory approaches, and failure of access rights of the local communities (Appiah, Fagg & Pappinen, 2015). In Kenya, reforestation projects like the Mau Forest reforestation project initiated by retired President Kibaki and former Minister Raila Odinga, who was the former prime minister, underwent serious community resistance problems. This affected the sustainability of the project even after millions of shillings had been pumped into the project. Reforestation projects in Kodera and Wire Forests also face similar problems of lack of sustainability due to factors such as community resistance and illegal logging. Therefore, there is an urgent need to investigate the varied factors that influence the sustainability of reforestation projects in Kodera and Wire Forests.

1.1 Objectives of the Study

The following objectives guided the study:

I. To assess the influence of public participation on the sustainability of reforestation projects in Kodera and Wire forests.

II. To assess the influence economic benefits on the sustainability of reforestation projects in Kodera and Wire forests.

III. To evaluate the influence of government policies on the sustainability of reforestation projects in Kodera and Wire Forests.

IV. To assess the influence of community awareness on the sustainability of reforestation projects in Kodera and Wire forests.

1.2 Research Hypotheses

The study sought to test the following hypotheses:

H_0**:** Public participation does not significantly influence the sustainability of reforestation projects in Kodera and Wire forests.

H_A**:** Public participation has a significant influence on the sustainability of reforestation projects in Kodera and Wire forests.

I. H_0**:** There is no significant relationship between economic benefits and the sustainability of reforestation projects in Kodera and Wire forests.

H_A**:** There is a significant relationship between economic benefits and the sustainability of reforestation projects in Kodera and Wire forests

II. H_0**:** Government policies do not significantly influence the sustainability of reforestation projects in Kodera and Wire Forests.

H_A*:* Government policies have a significant influence on the sustainability of reforestation projects in Kodera and Wire Forests.

III. H_0: Community awareness does not significantly influence on sustainability of reforestation in Kodera and Wire forests.

H_A: Community awareness has a significant influence on the sustainability of reforestation in Kodera and Wire forests

II. LITERATURE REVIEW

The sustainability concept has existed for the entire period that human beings have been concerned with the future of their resources. Water and food have to originate from somewhere, and even the most primitive cultures have to think about the impacts of the disappearance of animals and plants that they depend on. However, sustainability itself has a more recent origin. Founded in German, it was originally termed as "Nachhaltigkeit" to mean "sustained yield" and was used to refer to harvesting beyond what forests can provide. Towards the commencement of the 19th century, the translated version of the term appeared in English (The World Energy Foundation, 2018). Over the years, the meaning of the word has progressively changed to fit specific needs.

When ecology became a discipline, the term became inclusive and incorporated not only forests but the entire biological system. In this case, ecological sustainability denoted the ecosystem's ability to maintain its essential functions and preserve its biodiversity. There was yet a shift in the meaning of the term sustainability in the 20th century. During the period, there was an increased awareness of the overuse of resources and overdependence on fossil fuels. Towards the 1980s, it was used more in terms of sustainability of how human beings live on the planet (The World Energy Foundation, 2018). Currently, the more popular meaning of sustainability relates to sustainable development, which United Nations' Brundtland Commission (1987) defines as the development that fulfills the current population's needs without jeopardizing the future generations' capacity to satisfy their needs. The 2005 World Summit set three goals for sustainable development: environmental protection, economic, and social development (The World Energy Foundation, 2018). Sustainability is currently incorporated in most spheres like business organizations, finance, and project management.

Project sustainability is now an approach that is common in project management. All projects eventually have to end, but the project's impact should continue far into the future. For projects to be sustained, specific standards and parameters must be set from project identification, formulation, design, implementation, monitoring, and evaluation. Sustainability analysis will determine project adaptability, viability, acceptability, and relevance. A sustainable project should, therefore, be able to continue to produce desired impacts even after its implementation (The World Energy Foundation, 2018). In this regard, the concept of sustainability of reforestation projects entails the projects' ability to continue even after their implementation and produce the desired

effects, which include increased forest cover. It means that planted trees should be able to grow to maturity. This can only be possible when such projects involve the local communities to provide community ownership and provide the community's economic incentive. Existing government legislation should also provide an enabling environment for project implementation. The community must also be aware of the significance of such projects to facilitate their implementation (The World Energy Foundation, 2018).

2.1. Public Participation and the Sustainability of Reforestation Projects.

Research has shown that the involvement of the public is vital in promoting the sustainability of reforestation projects. Research conducted by Yamanoshita & Amano (2012) on the capability development for project sustainability in reforestation established that participation of all important stakeholders was vital in minimizing the risks of non-permanence of projects. The study identified that it is important to first develop community capability before implementing any reforestation project. Through questionnaires, surveys, and interviews, local villagers recorded that reforestation projects in Vietnam were not sustainable. They caused a land shortage for convectional activities like grazing and collection of fuel-wood. The level of public participation was evaluated by the number of meetings attended by the villagers (Yamanoshita & Amano, 2012). The public meeting forms the core of any public participation process and is a direct indicator of the extent of public involvement in any process of decision making. Public meetings bring together stakeholders in any development activity, and the views of each of the stakeholders are heard.

According to Park (2018), public participation goes beyond a technique; it is a way of working and acting. It requires both participants and organizers to have a more vivid understanding of the participatory approach's intent and the participation opportunities being organized. It should be based on cooperation, improved communication, and mutual trust among all participants. Public participation has a vital role in the sustainability of reforestation projects.

2.2 Economic Benefits and the Sustainability of Reforestation Projects.

Research carried out by Le, Smith, & Herbohn (2014) on the drivers of sustainability of reforestation projects in the developing world established that economic incentive was one of the important factors that determine the success of reforestation projects. The authors noted that the number of people directly employed or earning wages from the projects and number of households benefiting from reforestation products like honey, fruits, timber, and fodder are some of the important indicators of the extent or level of economic incentives associated with reforestation projects (Le, Smith, & Herbohn, 2014). Another study conducted by Bullock & King (2011) established that successful change of farmland under the "Grain for Grain" reforestation project in Wuqu and

Tianquan of Sichuan and Shaanxi provinces of China depended upon the development of the local economy. It means that the local population must be able to enjoy the economic benefits of the program directly. The authors concluded that without economic development of the rural communities, farmers would continue to rely on subsidy assistance to fulfill the ambitious environmental restriction policies hence undermining the sustainability of the program (Bullock & King, 2011). Analysis of these literatures shows that economic benefit is a vital factor that determines the sustainability of reforestation projects.

2.3 Government Policies and Sustainability of Reforestation Projects

Research conducted by Barr& Sayer (2012) on the restoration of forests and political economy in Asia pacific notes that sometimes, government policies that are designed to promote the sustainability of reforestation projects in some instances promotes the loss of biodiversity. The authors argue that the policies promote inequalities by concentrating resources in the hands of economic and political actors at the expense of local communities. To achieve sustainability, government policies and legislation on reforestation projects must focus on empowering local communities (Barr& Sayer, 2012). This argument makes sense because local communities play a central role in the sustainability of reforestation projects; hence government policies and legislation on reforestation should be centered on the local communities. Another study by Park & Lee (2014) on forest law and policy for sustainability around the Korean Peninsula established that while North Korea failed in ensuring the sustainability of its reforestation projects, South Korea succeeded due to its effective forest policies. South Korea integrated sectorial policies like economic development, land management, agricultural development, energy security, and reforestation. It also developed laws that treated forest conservation as a component of land management. Thus, projects that control erosion were carried out as part of the national greening program (Park & Lee, 2014). From this study, it is clear that government policies on reforestation must integrate other relevant sectorial policies and treat forest protection as part of land management. It should also focus on the community and eliminate social barriers of equality.

2.4 Community Awareness and the Sustainability of Reforestation Projects.

A study conducted by Reynolds, Farley & Huber, (2010) established that to achieve the sustainability of reforestation projects, community awareness on environmental threats must be done. Community awareness can be created through public awareness campaigns education. Communities must be educated on the benefits of reforestation projects and their significance before they are implemented. According to Persha et al. (2011), when members of local communities see how they benefit from forest services and products, they will dedicate their time and energy to reforestation projects. The

author asserts that an increased level of awareness on the significance of reforestation projects can also motivate local communities to modify their land-use patterns and resources to support conservation efforts. Forest use practices are determined by traditional beliefs, attitudes, and knowledge. Promoting indigenous knowledge can be vital in enhancing the sustainability of reforestation projects (Persha et al., 2010). FAO recognizes that the critical indicators for community awareness that can enhance the sustainability of reforestation projects include beliefs and attitudes towards forest conservation projects, level of education, and capacity building initiatives (FAO, 2019). Positive beliefs and attitudes towards reforestation projects can increase the local communities' confidence towards the projects; hence, the projects become acceptable. A high level of education, including traditional knowledge, can help the local communities understand the vital role of forest and subsequently understand the importance of sustaining reforestation projects. Adequate capacity building can provide people with access to networks, skills, and knowledge to scale up, implement, incentivize, and plan restoration projects and ensure their continuity (Bloomfield et al., 2019)

2.5 Theoretical Framework.

The theories of participation and conservation guided this study. Starting with the theory of participation, it can be traced to the English colonial era and ancient Greece. It was institutionalized in the 1960s during the Great Society programs by President Lyndon Johnson. Public participation gives private individuals the ability to influence decisions (Quick & Bryson, 2016). The theory is based on the broad approaches of decision-making structure, which entails the democratic and the technocratic approaches. The democratic approach is based on the premise that all who may be affected by a given decision have a right in the participation of that decision making. The technocratic approach applies technical knowledge, methods, and expertise to solve a problem. Other key themes of the theory of participation include legitimacy and diversity and inclusion. Legitimacy underpins a procedurally rational and just process that embodies democratic values like transparency and fairness (Quick & Bryson, 2016). Inclusion entails active negotiations among differences in institutional boundaries, identities, and perspectives. The second is the theory of conservation. Gifford Pinchot came up with the resource conservation ethic, which postulates that people see nature as a natural resource for their consumption. The theory can only be viable if resources were used prudently to produce the greatest benefit to the highest number of people in the longest time (Orbaşli, 2017).

III. RESEARCH METHODOLOGY

3.1 Research Design

The study adopted a descriptive design because it describes, records, and analyzes present conditions. Descriptive research entails a process or method of collecting and analyzing to

answer questions or test hypotheses regarding the status of the subjects studied (Edmonds & Kennedy, 2016). The research design was employed because it relates to the existing program, which is reforestation project. It used questionnaires as a research tool. The information that was collected was used to make the recommendations of the study.

3.2. Target Population

The study's target population was all the villages that exist within a radius of 2 kilometers from Kodera and Wire forests in Rachuonyo South Sub-County of Homa Bay County. Records from the Chiefs' offices indicated that 298 homes exist within a radius of 2 kilometers from Kodera and Wire forests. Records from the Registrar of Persons at Kosele, the sub-county headquarters, indicate that 920 adults live in the 298 homes.

3.3. Sample Size and Sampling Procedure

According to Mugenda & Mugenda (2003), sampling denotes the process of selecting participants in a study in a manner that is representative of the entire population.

3.3.1 Sample Size

According to Mugenda & Mugenda (2003), 10% to 30% of the total population that is accessible is appropriate for descriptive studies depending on the population size. This study being a descriptive, therefore, used a sample of 10%. The sample frame is illustrated in table 3.1 below.

Table 3.1: Sample frame

Respondents	Total Population	Sample (10%)
Villagers	920	92

3.3.2 Sampling Procedure

The study adopted probability sampling to select the sample for villagers. Probability sampling is unbiased and lacks systematic error (Acharya, Prakash, Saxena, & Nigam, 2013). It provides the best opportunity to create a truly representative sample of the population and generates highly reliable research findings (Mugenda & Mugenda, 2003). Stratified random sampling was adopted for the study to ensure unbiased representation of all the respondents. The villages were first divided into smaller sub-groups based on their income. Simple random sampling was then used to ensure that each sub-group member got an equal chance of being selected.

3.4 Data Collection Instruments

The primary data collection instrument for the study was questionnaires. A questionnaire is relatively easy to administer and analyze. It also allows a large number of samples within a given population to be contacted easily and at a relatively low cost. Most respondents are also familiar with questionnaires (Bryman, 2016). Primary data that was used for the study was collected using questionnaires. It comprised of closed-ended questions which focused on answering the research questions based on the study objectives.

3.4.1 Piloting of the Instruments

Piloting entails pre-testing the instruments of research before the actual data collection to establish their reliability and validity (Acharya, Prakash, Saxena, & Nigam, 2013). According to Mugenda and Mugenda (2003), a sample of 10% of the sample population is enough for piloting. Consequently, ten respondents were randomly selected from the sample population for pilot-testing. The questionnaires were administered to the respondents, and the responses were used to revise the questionnaires and make necessary adjustments.

3.5. Data Collection Procedure

The permission to carry out the collection was obtained from the Ministry of Education through the University of Nairobi's dean of postgraduate studies and a copy handed to the Forest Conservator before commencing data collection. A personal visit was made to all the sampled respondents. The visit was done in three phases. The first phase included visiting and notifying the forest conservators about the study. The second phase included visit the chiefs and notifying them about the study. The third was included visiting and administering the questionnaires on respondents in the company of the area chiefs and three research assistants.

IV. DATA ANALYSIS, PRESENTATION, AND INTERPRETATION

4.1 Questionnaire Return Rate

All the 92 questionnaires that were handed out were correctly filled and returned, achieving a 100% return rate which, was far above the required rate of 70%. According to Kothari (2007), a response rate exceeding 70% is adequate for analysis.

Table 4.1: Response Rate

Questionnaires issued	Questionnaires returned	% of questionnaires returned
92	92	100

4.2. Demographic Characteristics of Respondents

The study investigated the respondents' demographic characteristics, which mainly included the number of years lived in the village, gender, the highest level of education, occupation, and average monthly income.

4.2.1 Number of years lived in the Village

The study sought to obtain information on the number of years the respondents had lived in the given location as demonstrated in table 4.2

Table 4.2: Number of years lived in the village

	Frequency	Percent	Valid Percent	Cumulative Percent
10 - 20 years	12	13.0	13.0	13.0
20 - 30 years	31	33.7	33.7	46.7
More than 30 years	49	53.3	53.3	100.0
Total	92	100.0	100.0	

The study outcome established that most of the respondents at 53.3% had lived in their villages for more than 30 years while 33.7% had lived between 20 – 30 years while 13% had lived between 10 – 20 years.

4.2.2. Gender of the Respondents

The study sought for information on the respondents' gender as illustrated in table 4.3

Table 4.3: Distribution by Age

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	43	46.7	46.7	46.7
Female	49	53.3	53.3	100.0
Total	92	100.0	100.0	

Females represented 53.3% of the respondents while males were 46.7%. This was a fairly balanced gender distribution.

4.2.3. Highest Level of Education

The study looked for information on the respondents' highest education levels of the as highlighted in table 4.4

Table 4.4: Distribution by the Highest Level of Education

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary Certificate	29	31.5	31.5	31.5
Secondary Certificate	24	26.1	26.1	57.6
Diploma/Certificate	12	13.0	13.0	70.7
Bachelor's degree	5	5.4	5.4	76.1
Master's degree	2	2.2	2.2	78.3
No formal Education	20	21.7	21.7	100.0
Total	92	100.0	100.0	

The study found out that most of the respondents at 31.5% had primary certificates while 26.1% had secondary certificates. 21.7% lacked formal education while 5.4% had bachelor's degrees. Only 2.2% had master's degrees while 13% had diplomas or certificates.

4.2.4 Occupation of the Respondents

The study sought information on the respondents' occupation as highlighted in table 4.5

Table 4.5: Distribution by Occupation

	Frequency	Percent	Valid Percent	Cumulative Percent
Livestock farming	22	23.9	23.9	23.9
Crop farming	31	33.7	33.7	57.6
Casual laborer	16	17.4	17.4	75.0
Formal Employment	4	4.3	4.3	79.3
Business person	19	20.7	20.7	100.0
Total	92	100.0	100.0	

Majority of the respondents at 33.7% were crop farmers while a paltry 4.3% were formally employed. 23.9% were livestock farmers, 17.4% were casual laborers, while 20.7% were business persons

4.2.5. Average Income of the Respondents

The study established the average monthly income of the respondents in Kenya Shillings as demonstrated in table 4.6

Table 4.6: Distribution by Average Monthly Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than Ksh 5,000	22	23.9	23.9	23.9
	Ksh 5,000 - 10,000	42	45.7	45.7	69.6
	Ksh 10,000 - 15,000	11	12.0	12.0	81.5
	Ksh 15,000 - 20,000	9	9.8	9.8	91.3
	More than 20,000	8	8.7	8.7	100.0
	Total	92	100.0	100.0	

The findings indicated that most of the respondents at 45.7% earned between Ksh. 5,000 - 10,000, while 23.9% earned less than Ksh 5,000. 12% earned between Ksh 10,000 - 15,000 while 9% earned between Ksh 15,000 - 20,000. Only 8% earned more than 20,000.

4.3 Public Participation and the Sustainability of Reforestation Projects

The first objective was to assess the influence of public participation on the sustainability of reforestation projects in Kodera and Wire forests. The data was captured on a 5-point Likert scale, and the study findings were as shown in table 4.7

Table 4.7: Public Participation and the Sustainability of Reforestation Projects

Statement		Frequency	%	Mean	Std.Dev
Many public meeting regarding reforestation projects are organized	Strongly Disagree	21	22.8		
	Disagree	47	51.1		
	Neither Agree Nor Disagree	4	4.3		
	Agree	14	15.2		

Statement		Frequency	%	Mean	Std.Dev
	Strongly Agree	6	6.5		
	Total	92	100.0	2.3152	1.17604
Members of the public are invited to attend meetings	Strongly Disagree	21	22.8		
	Disagree	47	51.1		
	Neither Agree Nor Disagree	3	3.3		
	Agree	15	16.3		
	Strongly Agree	6	6.5		
	Total	92	100.0	2.3261	1.18701
Many people attend the public participation meetings	Strongly Disagree	20	21.7		
	Disagree	48	52.2		
	Neither Agree Nor Disagree	5	5.4		
	Agree	12	13.0		
	Strongly Agree	7	7.6		
	Total	92	100.0	2.3261	1.17771
Members of the public are freely allowed to air their views	Strongly Disagree	12	13.0		
	Disagree	12	13.0		
	Neither Agree Nor Disagree	46	50.0		
	Agree	15	16.3		
	Strongly Agree	7	7.6		
	Total	92	100.0	2.9239	1.06114
Public views are adequately incorporated in the reforestation projects	Strongly Disagree	16	17.4		
	Disagree	31	33.7		
	Neither Agree Nor Disagree	27	29.3		
	Agree	11	12.0		
	Strongly Agree	7	7.6		
	Total	92	100.0	2.5870	1.14020
Community members are adequately involved in the implementation of reforestation projects	Strongly Disagree	14	15.2		
	Disagree	36	39.1		
	Neither Agree Nor Disagree	19	20.7		
	Agree	17	18.5		
	Strongly Agree	6	6.5		
	Total	92	100.0	2.6196	1.14683
Public participations has a significant influence on the sustainability of reforestation projects	Strongly Disagree	1	1.1		
	Disagree	2	2.2		
	Neither Agree Nor Disagree	2	2.2		
	Agree	51	55.4		
	Strongly Agree	36	39.1		
	Total	92	100.0	4.2935	.71925
	Composite mean			2.7702	

The study findings displayed in table 4.7 above shows a composite mean of 2.7702 of the respondents who agreed that public participation influenced the sustainability of reforestation projects. This was supported by the key statements that majority of the respondents with a mean score of 4.2935 and a standard deviation of .71925 agreed that public participation has a significant influence on the sustainability of reforestation projects. A mean score of 2.3152 and a standard deviation of 1.17604 agreed that public meetings regarding reforestation projects were organized. A mean score of 2.3261 and a standard deviation of 1.18701 agreed that members of the public are invited to attend the public meetings. A mean score of 2.3261 and a standard deviation of 1.17771 agreed that many people attend the public participation meetings. A mean score of 2.9239 and a standard deviation of 1.06114 agreed that members of the public are freely allowed to air their views. A mean score of 2.5870 and a standard deviation of 1.14020 agreed that public views are adequately incorporated in the reforestation projects. A mean score of 2.6196 and standard deviation of 1.14683 agreed that community members are adequately involved in the implementation of reforestation projects.

4.4 Economic Benefits and the Sustainability of Reforestation Projects

The second objective sought to assess the influence of economic benefits on the sustainability of reforestation projects in Kodera and Wire forests. The data was captured on a 5-point Likert scale and the findings of the study were as highlighted in table 4.8

Table 4.8: Economic Benefits and the Sustainability of Reforestation Projects

Statement		Frequency	%	Mean	Std.Dev
Many people are directly employed or earning wages from reforestation projects	Strongly Disagree	21	22.8		
	Disagree	36	39.1		
	Neither Agree Nor Disagree	7	7.6		
	Agree	18	19.6		
	Strongly Agree	10	10.9		
	Total	92	100.0	2.5652	1.32851

Communities are allowed to access reforestation products	Strongly Disagree	22	23.9		
	Disagree	49	53.3		
	Neither Agree Nor Disagree	3	3.3		
	Agree	11	12.0		
	Strongly Agree	7	7.6		
	Total	92	100.0	2.2609	1.17548
Reforestation projects have improved the standard of living in the community	Strongly Disagree	21	22.8		
	Disagree	45	48.9		
	Neither Agree Nor Disagree	4	4.3		
	Agree	13	14.1		
	Strongly Agree	9	9.8		
	Total	92	100.0	2.3913	1.25756
Employment in the reforestation projects is done in a transparent manner	Strongly Disagree	25	27.2		
	Disagree	41	44.6		
	Neither Agree Nor Disagree	5	5.4		
	Agree	14	15.2		
	Strongly Agree	7	7.6		
	Total	92	100.0	2.3152	1.23972
Economic benefits have significant influence on the sustainability of reforestation projects	Strongly Disagree	2	2.2		
	Disagree	3	3.3		
	Neither Agree Nor Disagree	4	4.3		
	Agree	24	26.1		
	Strongly Agree	59	64.1		
	Total	92	100.0	4.4674	.89505
	Composite mean			2.8	

The study findings exhibited in table 4.8 above shows a composite mean of 2.8 of the respondents who agreed that economic benefits influenced the sustainability of reforestation projects. This was supported by the key statements that majority of the respondents with a mean score of 4.4674 and standard deviation of .89505 agreed that

economic benefits have significant influence on the sustainability of reforestation projects. A mean score of 2.5652 and a standard deviation of 1.32851 agreed that many people are directly employed or earning wages from reforestation projects. A mean score of 2.2609 and a standard deviation of 1.17548 agreed that communities are allowed to access reforestation products. A mean score of 2.3913 and a standard deviation of 1.125756 agreed that reforestation projects have improved the standard of living in the community. A mean score of 2.3152 and a standard deviation of 1.23972 agreed that employment in the reforestation projects is done in a transparent manner

4.5 Government Policy and the Sustainability of Reforestation Projects

The third objective was to evaluate the influence of economic benefits on the sustainability of reforestation projects in Kodera and Wire forests. The data was captured on a 5-point Likert scale, and the findings of the study were as shown in table 4.9

Table 4.9: Government Policy and the Sustainability of Reforestation Projects

Statement		Frequency	%	Mean	Std.Dev
There are adequate government policies on reforestation	Strongly Disagree	10	10.9		
	Disagree	11	12.0		
	Neither Agree Nor Disagree	24	26.1		
	Agree	31	33.7		
	Strongly Agree	16	17.4		
	Total	92	100.0	3.3478	1.21741
Government policies on reforestation focuses on the community	Strongly Disagree	24	26.1		
	Disagree	35	38.0		
	Neither Agree Nor Disagree	19	20.7		
	Agree	10	10.9		
	Strongly Agree	4	4.3		
	Total	92	100.0	2.2935	1.10482
Government policies on	Strongly Disagree	25	27.2		

reforestation focus on equality	Disagree	36	39.1		
	Neither Agree Nor Disagree	17	18.5		
	Agree	9	9.8		
	Strongly Agree	5	5.4		
	Total	92	100.0	2.2717	1.13004
Government policy should be changed	Strongly Disagree	21	22.8		
	Disagree	45	48.9		
	Neither Agree Nor Disagree	4	4.3		
	Agree	13	14.1		
	Strongly Agree	9	9.8		
	Total	92	100.0	2.3913	1.25756
Government policy has significant influence on sustainability of reforestation projects	Strongly Disagree	1	1.1		
	Disagree	2	2.2		
	Neither Agree Nor Disagree	2	2.2		
	Agree	37	40.2		
	Strongly Agree	50	54.3		
	Total	92	100	4.4457	.74663
	Composite mean			9.5	

The study findings had shown in table 4.9 above shows a composite mean of 2. 95 of the respondents who agreed that government policy influenced the sustainability of reforestation projects. This was supported by the key statements that that majority of the respondents with a mean score of 4.4457 and a standard deviation of .74663 agreed that government policy has significant influence on sustainability of reforestation projects. A mean score of 3.3478 and a standard deviation of 1.21741 agreed that there are adequate government policies on reforestation. A mean score of 2.2935 and a standard deviation of 1.10482 agreed that government policies on reforestation focuses on the community. A mean

score of 2.2717 and a standard deviation of 1.13004 agreed that government policies on reforestation focus on equality. A mean score of 2.3913 and a standard deviation of 1.25756 agreed that government policies on reforestation should be changed to address the needs of the community

4.6 Community Awareness and the Sustainability of Reforestation Projects

The fourth objective was to assess the influence of community awareness on the sustainability of reforestation projects in Kodera and Wire forests. The data was captured on a 5-point Likert scale, and the findings of the study were as shown in table 4.10

Table 4.10: Community Awareness and the Sustainability of Reforestation Projects

Statement		Frequency	%	Mean	Std.Dev
Community members are adequately sensitized on reforestation projects	Strongly Disagree	31	33.7		
	Disagree	42	45.7		
	Neither Agree Nor Disagree	7	7.6		
	Agree	8	8.7		
	Strongly Agree	4	4.3		
	Total	92	100.0	2.0435	1.07839
Many community awareness meetings are held	Strongly Disagree	29	31.5		
	Disagree	41	44.6		
	Neither Agree Nor Disagree	8	8.7		
	Agree	9	9.8		
	Strongly Agree	5	5.4		
	Total	92	100.0	2.1304	1.13115
A large number of community members are involved in the meetings	Strongly Disagree	29	31.5		
	Disagree	39	42.4		
	Neither Agree Nor Disagree	6	6.5		
	Agree	11	12.0		
	Strongly Agree	7	7.6		
	Total	92	100.0	2.2174	1.22990
Proper and timely invitations for the meetings are done	Strongly Disagree	31	33.7		
	Disagree	38	41.3		
	Neither Agree Nor Disagree	4	4.3		

	Agree	11	12.0		
	Strongly Agree	8	8.7		
	Total	92	100.0	2.2065	1.27131
The meetings are beneficial and relevant to the projects being undertaken	Strongly Disagree	12	13.0		
	Disagree	20	21.7		
	Neither Agree Nor Disagree	39	42.4		
	Agree	15	16.3		
	Strongly Agree	6	6.5		
	Total	92	100.0	2.8152	1.06832
Reforestation projects are beneficial	Strongly Disagree	7	7.6		
	Disagree	8	8.7		
	Neither Agree Nor Disagree	5	5.4		
	Agree	32	34.8		
	Strongly Agree	40	43.5		
	Total	92	100	3.9783	1.24015
Community awareness has significant influence on sustainability of reforestation projects	Strongly Disagree	1	1.1		
	Disagree	2	2.2		
	Neither Agree Nor Disagree	1	1.1		
	Agree	20	21.7		
	Strongly Agree	68	73.9		
	Total	92	100	4.6522	.71767
	Composite mean			2.8634	

The study findings showed in table 4.10 above shows a composite mean of 2. 8634 of the respondents who agreed that community awareness influenced the sustainability of reforestation projects. This was supported by the key statements that majority of the respondents with a mean score of 4.6522 and a standard deviation of .71767 agreed that community awareness has significant influence on sustainability of reforestation projects. A mean score of 2.0435 and a standard deviation of 1.07839 agreed that community members are adequately sensitized on reforestation projects. A mean score of 2.1304 and a standard deviation of 1.13115 agreed that many community awareness meetings are held. A mean score of 2.2174 and a standard

deviation of 1.22990 agreed that a large number of community members are involved in the meetings. A mean score of 2.2065 and a standard deviation of 1.27131 agreed that proper and timely invitations for the meetings are done. A mean score of 2.8152 and a standard deviation of 1.06832 agreed that the meetings are beneficial and relevant to the projects being undertaken. A mean score of 3.9783 and a standard deviation of 1.24015 agreed that reforestation projects are beneficial

4.7. The Sustainability of Reforestation Projects in Kodera and Wire Forests

The study investigated the level of sustainability of reforestation projects in Kodera and Wire forests. The data was captured on a 5-point Likert scale, and the findings of the study were as discussed in table 4.11

Table 4.11: The sustainability of Reforestation Projects in Kodera and Wire Forests

Statement		Frequency	%	Mean	Std.Dev
The trees continue to grow after the implementation of reforestation projects	Strongly Disagree	9	9.8		
	Disagree	35	38.0		
	Neither Agree Nor Disagree	23	25.0		
	Agree	17	18.5		
	Strongly Agree	8	8.7		
	Total	92	100.0	2.7826	1.12734
There is community ownership of reforestation projects	Strongly Disagree	24	26.1		
	Disagree	33	35.9		
	Neither Agree Nor Disagree	9	9.8		
	Agree	13	14.1		
	Strongly Agree	12	13.0		
	Total	92	100	2.5165	1.36921
Community members continue to benefit from the reforestation projects after their implementation	Strongly disagree	28	30.4		
	Disagree	27	29.3		
	Neither agree nor disagree	7	7.6		
	Agree	20	21.7		
	Strongly agree	10	10.9		
	Total	92	100.0	2.5326	1.40213
The projects enhance forest cover	Strongly Disagree	9	9.8		
	Disagree	11	12.0		
	Neither Agree Nor Disagree	4	4.3		
	Agree	51	55.4		

	Strongly Agree	17	18.5		
	Total	92	100.0	3.6087	1.20399
The projects conserve biodiversity	Strongly Disagree	9	9.8		
	Disagree	10	10.9		
	Neither Agree Nor Disagree	6	6.5		
	Agree	49	53.3		
	Strongly Agree	18	19.6		
	Total	92	100.0	3.6196	1.20295
	Composite mean			3.012	

The study findings shown in table 4.11 above shows a composite mean of 3.012 of the respondents who agreed that reforestation projects in Kodera and Wire forests were sustainable. This was supported by the key statements that majority of the respondents with a mean score of 2.7826 and a standard deviation of 1.40213 agreed that the trees continue to grow after the implementation of reforestation projects. A mean score of 2.5165 and a standard deviation of 1.36921 agreed that there is community ownership of reforestation projects. A mean score of 2.5326 and a standard deviation of 1.40213 agreed that community members continue to benefit from the reforestation projects after implementation. A mean score of 2.9130 and a standard deviation of 1.16404 agreed that the projects enhance forest cover. A mean score of 2.6848 and a standard deviation of 1.05798 agreed that the projects conserve biodiversity

4.8. Hypothesis Testing

The study tested the following four hypotheses

4.8.1: Public participation does not have a significant influence on the sustainability of reforestation projects in Kodera and Wire forests.

The result of the F-test-Two Sample for Variances is shown in table 4.12

Table 4.12: Public Participation and Sustainability		
	Public Participation	Sustainability
Mean	2.770186335	3.015217391
Variance	0.181635578	0.336029623
Observations	92	92
df	91	91
F	0.540534423	
P(F<=f) one-tail	0.001843785	
F-Critical one-tail	0.707043252	

The findings shown in table 4.12 shows that the P-value was 0.001843785 at 95% confidence level. This value is less than 0.05; thus, rejecting the null hypothesis. This demonstrated that there was a statistically significant relationship between public participation and the sustainability of reforestation projects.

4.8.2: There is no significant relationship between economic benefits and the sustainability of reforestation projects in Kodera and Wire forests.

The result of the F-test-Two Sample for Variances is shown in table 4.13

Table 4.13: Economic Benefits and Sustainability

	Economic Benefits	Sustainability
Mean	2.813421	3.021978
Variance	0.166681	0.335512
Observations	92	92
Df	91	91
F	0.573681	
P(F<=f) one-tail	0.009802	
F-Critical one-tail	0.705672	

The findings shown in table 4.13 shows that the P-value was 0.009802 at 95% confidence level. This value is less than 0.05 thus; rejecting the null hypothesis. This demonstrated that there was a statistically significant relationship between economic benefits and the sustainability of reforestation projects.

4.8.3: Government policy does not have a significant influence on the sustainability of reforestation projects in Kodera and Wire Forests.

The result of the F-test-Two Sample for Variances is shown in table 4.14

Table 4.14: Government Policy and Sustainability

	Government Policies	Sustainability
Mean	2.951320	3.021978
Variance	0.231922	0.335512
Observations	92	92
Df	91	91
F	0.691248	
P(F<=f) one-tail	0.040775	
F-Critical one-tail	0.705672	

The findings shown in table 4.14 shows that the P-value was 0.040775 at 95% confidence level. This value is less than 0.05; thus, rejecting the null hypothesis. This demonstrated that there was a statistically significant relationship between

government policy and the sustainability of reforestation projects

4.8.4: Community awareness does not have a significant influence on the sustainability of reforestation in Kodera and Wire forests.

The result of the F-test-Two Sample for Variances is shown in table 4.15 below

Table 4.15: Community Awareness and Sustainability

	Community Awareness	Sustainability
Mean	2.863357	3.021978
Variance	0.168548	0.335512
Observations	92	92
Df	91	91
F	0.502361	
P(F<=f) one-tail	0.000629	
F-Critical one-tail	0.705672	

The findings shown in table 4.15 shows that the P-value was 0.000692 at 95% confidence level. This value is less than 0.05; thus, rejecting the null hypothesis. This demonstrated that there was a statistically significant relationship between community awareness and the sustainability of reforestation projects

V. SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of Findings

The study sampled 92 villagers who lived within a radius of 2 kilometers from Kodera and Wire forests. A total of 92 questionnaires were administered on the villager. All the questionnaires were appropriately filled and returned, resulting in a 100% return rate. The reliability of the questionnaires was established using the test-retest method. A coefficient of 0.8 was obtained, indicating that the questionnaires were highly reliable. The study established that most of the respondents at 53.3% had lived in the villages surrounding Wire and Kodera forests for more than 30 years, while 33.7% had lived between 20 – 30 years. Only 13% had lived between 10 – 20 years. The majority of the respondents at 53.3% were females, while males were 46.7%. This showed a balanced gender distribution. The majority of the respondents at 31.5% had a primary certificate, while 26.1% had a secondary certificate. 21.7% lacked formal education, while 5.4% had a bachelor's degree. Only 2.2% had a master's degree while 13% had a diploma or certificate. Most of the respondents at 33.7% were crop farmers, while a paltry 4.3% were formally employed. 23.9% were livestock farmers, 17.4% were casual laborers, while 20.7% were business persons. The study also established that majority of the respondents at 45.7% earned between Ksh. 5,000 - 10,000, while 23.9% earned less than Ksh 5,000. 12% earned between Ksh 10,000 - 15,000 while 9% earned between Ksh 15,000 - 20,000. Only 8% earned more than 20,000. An average mean of 2.7702 showed that public participation influenced the sustainability of reforestation projects, while the mean of 2.8 revealed that economic benefits influenced the sustainability of reforestation projects. Besides, the means of 2.95 and 2.8634 showed that government policy and community awareness influenced the sustainability of reforestation projects, respectively. Finally a mean of 3.012 revealed an influence on the sustainability reforestation projects in Kodera and Wire forests. The P-values for the influence of public participation, economic benefits, government policy, and community awareness on sustainability were 0.001843785, 0.009802, 0.040775, and 0.000629, respectively, thus, rejecting all the null hypotheses.

5.2 Discussion of the Findings

The study established that a composite mean of 2.7702 of the respondents agreed that public participation influenced the sustainability of reforestation projects. This was supported by the key statements that the majority of the respondents with a mean score of 4.2935 and a standard deviation of .71925 strongly agreed that public participation has a significant influence on the sustainability of reforestation projects. A mean score of 2.3152 and a standard deviation of 1.17604 agreed that public meetings regarding reforestation projects were organized. A mean score of 2.3261 and a standard deviation of 1.18701 agreed that members of the public are invited to attend the public meetings. A mean score of 2.3261 and a standard deviation of 1.17771 agreed that many people attend the public participation meetings. A mean score of 2.9239 and a standard deviation of 1.06114 agreed that members of the public are freely allowed to air their views. A mean score of 2.5870 and a standard deviation of 1.14020 agreed that public views are adequately incorporated in the reforestation projects. A mean score of 2.6196 and a standard deviation of 1.14683 agreed that community members are adequately involved in the implementation of reforestation projects. To further support these results, the F-test-Two Sample for Variances showed that the P-Value for the relationship between public participation and the sustainability of reforestation projects was .001843785 at 95% confidence level. This value was less than 0.05 hence, rejecting the null hypothesis. This demonstrated that there was a statistically significant relationship between public participation and the sustainability of reforestation projects. These results were consistent with the findings of a study conducted by (Ghazanfari, Namiranian, Sobhani & Mohajer, 2014) which established that public participation significantly influenced the sustainability of reforestation projects in Northern Zagros Mountains of Kurdistan province in Iran. The authors concluded that traditional forest management practices could enhance public participation in sustainable forest management. Important indicators for effective public participation included frequent public participation meetings and adequate inclusion of public views in forest management.

Another study by Tabot, Owuor & Migosi (2020) also established that the sustainability of forestry projects significantly relied on community participation. Community members must be involved during project initiation.

The study revealed a composite mean of a composite mean of 2. 9500 of the respondents who agreed that government policy influenced the sustainability of reforestation projects. This was supported by the key statements that the majority of the respondents with a mean score of 4.4457 and a standard deviation of .74663 strongly agreed that government policy has a significant influence on the sustainability of reforestation projects. A mean score of 3.3478 and a standard deviation of 1.21741 agreed that there are adequate government policies on reforestation. A mean score of 2.2935 and a standard deviation of 1.10482 agreed that government policies on reforestation focus on the community. A mean score of 2.2717 and a standard deviation of 1.13004 agreed that government policies on reforestation focus on equality. A mean score of 2.3913 and a standard deviation of 1.25756 agreed that government policies on reforestation should be changed to address the community's needs. The F-test-Two Sample for Variances showed that the P-Value was .009802 at 95% confidence level. This value was less than 0.05; hence, the null hypothesis was rejected. This demonstrates a statistically significant relationship between the economic benefits and the sustainability of reforestation projects. These findings were consistent with the results of a study conducted by (Ofoegbu et al., 2017) that the sustainability and effectiveness of forest-based climate change initiatives can be enhanced by improving the economic and social conditions that exist in households around forests. The economic conditions were income levels and standards of living (Ofoegbu et al., 2017). Another study by Le, Smith & Herbohn (2014) established that incentives from reforestation projects significantly contributed to their sustainability.

The study established a composite mean of 2. 95 of the respondents who agreed that government policy influenced the sustainability of reforestation projects. This was supported by the key statements that the majority of the respondents with a mean score of 4.4457 and a standard deviation of .74663 strongly agreed that government policy has a significant influence on the sustainability of reforestation projects. A mean score of 3.3478 and a standard deviation of 1.21741 agreed that there are adequate government policies on reforestation. A mean score of 2.2935 and a standard deviation of 1.10482 agreed that government policies on reforestation focus on the community. A mean score of 2.2717 and a standard deviation of 1.13004 agreed that government policies on reforestation focus on equality. A mean score of 2.3913 and a standard deviation of 1.25756 agreed that government policies on reforestation should be changed to address the needs of the community. The F-test-Two Sample for Variances showed that the P-value was 0.040775 at 95% confidence level. This value was less than 0.05 hence, rejecting the null hypothesis. This demonstrated that there was

a statistically significant relationship between government policy and the sustainability of reforestation projects. These findings were consistent with the results of the study conducted by Kim & Alounsavath (2015), which established that forest policy had a significant influence on the increase in forest cover. Another study by Le, Smith & Herbohn (2014) concluded that government policy was a major driver for the sustainability of reforestation projects. According to the authors, community-focused policies dealing with vegetation strategies can have beneficial effects on the success of reforestation projects (Le, Smith & Herbohn, 2014)

The study revealed a composite mean of 2. 8634 of the respondents who agreed that community awareness influenced reforestation projects' sustainability. This was supported by the key statements that the majority of the respondents with a mean score of 4.6522 and a standard deviation of .71767 agreed that community awareness has a significant influence on the sustainability of reforestation projects. A mean score of 2.0435 and a standard deviation of 1.07839 agreed that community members are adequately sensitized on reforestation projects. A mean score of 2.1304 and a standard deviation of 1.13115 agreed that many community awareness meetings are held. A mean score of 2.2174 and a standard deviation of 1.22990 agreed that many community members are involved in the meetings. A mean score of 2.2065 and a standard deviation of 1.27131 agreed that proper and timely invitations for the meetings are done. A mean score of 2.8152 and a standard deviation of 1.06832 agreed that the meetings are beneficial and relevant to the projects being undertaken. A mean score of 3.9783 and a standard deviation of 1.24015 agreed that reforestation projects are beneficial. The results of the F-test-Two Sample for Variances showed that the P-value was 0.000692 at 95% confidence level. This value was less than 0.05 hence, rejecting the null hypothesis. This demonstrated that there was a statistically significant relationship between community awareness and the sustainability of reforestation projects. These findings were consistent with the results of the study conducted by Owoeye, Olayide, & Njuguna (2019), which established that community awareness and engagement were crucial for value addition and regular participation in reforestation projects leading to their success and sustainability. Another study by Rauf et al. (2019) concluded that community awareness was the most significant determinant of the success of reforestation projects in Pakistan.

The study revealed a composite mean of 3.012 of the respondents who agreed that reforestation projects in Kodera and Wire forests were sustainable. This was supported by the key statements that the majority of the respondents that mean score of 2.7826 and standard deviation of 1.40213 agreed that the trees continue to grow after the implementation of reforestation projects. A mean score of 2.5165 and a standard deviation of 1.36921 agreed that there is community ownership of reforestation projects. A mean score of 2.5326 and a standard deviation of 1.40213 agreed that community

members continue to benefit from the reforestation projects after implementation. A mean score of 2.9130 and a standard deviation of 1.16404 agreed that the projects enhance forest cover. A mean score of 2.6848 and a standard deviation of 1.05798 agreed that the projects conserve biodiversity. These findings were consistent with the results of the study conducted by Peras (2016), which concluded that community ownership and the ability of the trees to grow after the implementation of the reforestation projects were the most significant indicators of the success and sustainability of reforestation projects.

5.3 Conclusion

From the discussion above, several conclusions were drawn.

The study revealed that public participation significantly influenced the sustainability of reforestation projects in Kodera and Wire forests in Rachuonyo South Sub-County, Homa Bay County. This was attributed to the majority of the respondents attesting that public participation significantly influenced the sustainability of reforestation projects. However, public participation regarding reforestation projects in Kodera and Wire forests is still inadequate as few respondents agreed with the statements that; many public meetings regarding reforestation projects are organized, members of the public are invited to attend the public meetings, many people attend the public participation meetings, public views are adequately incorporated in the reforestation projects, and community members are adequately involved in the implementation of the reforestation projects in Kodera and wire forests.

Economic benefits significantly influenced the sustainability of reforestation projects in Kodera and Wire forests in Rachuonyo South Sub-County, Homa Bay County. This was attributed to the majority of the respondents attesting that public participation had a significant influence on the sustainability of reforestation projects. However economic benefits of reforestation projects in Kodera and Wire forests remain a critical issue as few respondents agreed with the statements that; many people are directly employed or earning wages from reforestation projects, communities are allowed to access reforestation products, employment in the reforestation projects is done transparently, and reforestation projects have improved the standard of living in the community, and in Kodera and Wire forests.

Government policy significantly influenced the sustainability of reforestation projects in Kodera and Wire forests in Rachuonyo South Sub-County, Homa Bay County. This was attributed to the majority of the respondents agreeing that government policy had a significant influence on the sustainability of reforestation projects. However, there are underlying issues with government policies that deal with reforestation projects as few respondents agreed that government policies on reforestation projects focus on the community and promote equality. The majority of the respondents agreed that the policies should be changed.

Again, community awareness significantly influenced the sustainability of reforestation projects in Kodera and Wire forests in Rachuonyo South Sub-County, Homa Bay County This was attributed to the majority of the respondents agreeing that community awareness had a significant influence on the sustainability of reforestation projects and that, the reforestation projects are beneficial. However, community awareness regarding reforestation projects in Kodera and Wire forest is inadequate as few respondents agreed with the statements that; community members are adequately sensitized on reforestation projects, many community awareness meetings are held, a large number of community members are involved in the meetings, proper and timely invitations for the meetings are done, and the meetings are beneficial and relevant to reforestation projects being undertaken in Kodera and Wire forests.

The study established that the sustainability of reforestation projects in Kodera and Wire forests in Rachuonyo South Sub-County, Homa Bay County is influenced by the ability of the trees to continue growing after implementation of the reforestation projects, community ownership, community members continuing to benefit from the reforestation projects after implementation, and ability of the projects to enhance forest cover and biodiversity.

In summary, public participation, economic benefits, government policy, and community awareness have a significant influence on the sustainability of reforestation projects in Kodera and Wire forests in Rachuonyo South Sub-County, Homa Bay County.

5.4 Recommendations

Based on the findings of the study, the following were recommended

1. Public participation is vital in project management; hence many public meetings regarding the projects should be organized. Members of the public should be properly invited to attend the public meetings, and implementers should ensure that many people attend public participation meetings. Public views should be adequately incorporated into the projects, and community members should be sufficiently involved in the implementation of the projects.
2. Ensure that the community members benefit economically from the projects by employing many members of the community transparently. The projects should also improve the standards of living in the community, and community members should be allowed to access the products of the project. Local communities must be put at the center of any project.
3. Government policies that relate to projects should promote equality focus on the community.
4. There must be adequate community awareness of projects. Community awareness of projects should be enhanced through adequate sensitization meetings.

Invitation to the meetings should be proper and timely, and the meetings should be relevant to the project being undertaken.

5.4.1 Suggestions for Further Studies

This study's focus was to determine the influence of public participation, economic benefits, government policy, and community awareness on the sustainability of reforestation projects. Further studies should be done on the following:

1. Political influence on the sustainability of reforestation projects
2. Influence of income levels on the sustainability of reforestation projects
3. Influence of literacy levels on the sustainability of reforestation projects
4. Influence of tree species on the sustainability of reforestation projects

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7. APPENDICES

APPENDIX I: LETTER OF INTRODUCTION TO THE RESPONDENTS

Dear Sir/Madam,

RE: **Sustainability of Reforestation Projects in Kodera and Wire Forest in Rachuonyo South Sub-County, Homa Bay County**

I am a postgraduate student at the University of Nairobi, pursuing a Master of Arts degree in project planning and management researching the above topic.

You have been selected as a respondent to this study. I, therefore, humbly request you to answer the questions in the questionnaire. I assure you that the information that you will provide will solely be used for academic purposes and treated with the highest levels of confidence.

Please do not write your name or telephone number on the questionnaire. Thank you.

Tobias Ouma Mboya

APPENDIX 11: QUESTIONNAIRE FOR HOUSEHOLDS

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

(To be filled by a person above 18 years old in a household, preferably household head)

How long have you lived here?

Below 10 years   [ ]

10-20 years   [ ]

20-30 years   [ ]

More than 30 years   [ ]

Gender of respondent

Male   [ ]   Female   [ ]

What is your highest level of education?

Primary certificate   [ ]
Secondary certificate   [ ]
Diploma/certificate   [ ]
Bachelor's degree   [ ]
Master's degree   [ ]
No formal education   [ ]
Others (please specify)………………………………………….

1. What is your occupation?

Livestock farming   [ ]
Crop farming   [ ]
Casual laborer   [ ]
Formal employment   [ ]
Businessperson   [ ]
Others (Please specify)……………………………………….

2. What is your average monthly income?

Less than 5,000	[ ]
5,000 – 10,000	[ ]
10,000 – 15,000	[ ]
15,000- 20,000	[ ]
More than 20,000	[ ]

SECTION B: PUBLIC PARTICIPATION AND SUSTAINABILITY OF REFORESTATION PROJECTS

3. The following statements relate to public participation in reforestation projects. In your opinion, indicate how frequently the following activities are carried out.

Use the Likert scale 5-1, where, 5=strongly agree, 4= agree, 3= neither agree nor disagree, 2= Disagree, 1= strongly disagree

SN	Statement	5	4	3	2	1
1	Many public meetings regarding reforestation projects are organized					
2	Members of the public are invited to attend the public meetings					
3	Many people attend the public participation meetings					
4	Members of the public are freely allowed to air their views					
5	Public views are adequately incorporated in the reforestation projects					
6	Community members are adequately involved in the implementation of reforestation projects					
7	Public participation has a significant influence on the sustainability of reforestation projects					

SECTION C: ECONOMIC BENEFITS AND SUSTAINABILITY OF REFORESTATION PROJECTS

4. In your opinion, rate the following statements on the economic benefits of reforestation projects.
Use the Likert scale 5-1, where, 5=strongly agree, 4= agree, 3= neither agree nor disagree,
2= Disagree, 1= strongly disagree

SN	Statement	5	4	3	2	1
1	Many people are directly employed or earning wages from reforestation projects					
2	Communities are allowed to access reforestation products					
3	Reforestation projects have improved the standard of living in the community					
4	Employment in the reforestation projects is done in a transparent manner					
5	Economic benefits have significant influence on the sustainability of reforestation projects					

SECTION D: GOVERNMENT POLICY AND SUSTAINABILITY OF REFORESTATION PROJECTS

5. In your opinion, rate the following statements on government policy and reforestation projects.
Use the Likert scale 5-1, where, 5=strongly agree, 4= agree, 3= neither agree nor disagree,
2= Disagree, 1= strongly disagree

SN	Statement	5	4	3	2	1
1	There are adequate government policies on reforestation					
2	Government policies on reforestation focuses on the community					
3	Government policies on reforestation focus on equality					
4	Government policies on reforestation should be changed to address the needs of the community					
5	Government policy has a significant influence on the sustainability of reforestation projects					

SECTION E: COMMUNITY AWARENESS AND SUSTAINABILITY OF REFORESTATION PROJECTS

6. The following statements relate to community awareness in reforestation projects. In your opinion, indicate the extent to which you agree or disagree with the following statements.

Use the Likert scale 5-1, where, 5=strongly agree, 4= agree, 3= neither agree nor disagree,

2= Disagree, 1= strongly disagree

2= Disagree, 1= strongly disagree

SN	Statement	5	4	3	2	1
1	Community members are adequately sensitized on reforestation projects					
2	Many community awareness meetings are held					
3	A large number of community members are involved in the meetings					
4	Proper and timely invitations for the meetings are done					
5	The meetings are beneficial and relevant to the projects being undertaken					
6	Reforestation projects are beneficial					
7	Community awareness has a significant influence on the sustainability of reforestation projects					

SECTION F: THE SUSTAINABILITY OF REFORESTATION PROJECTS

7. In your opinion, rate the following statements on the sustainability of reforestation projects. Use the Likert scale 5-1, where, 5=strongly agree, 4= agree, 3= neither agree nor disagree,
2= Disagree, 1= strongly disagree

SN	Statement	5	4	3	2	1
1	The trees continue to grow after the implementation of reforestation projects					
2	There is community ownership of reforestation projects					
3	Community members continue to benefit from the reforestation projects after implementation					
4	The projects enhance forest cover					
5	The projects conserve biodiversity					

THANK YOU