# INFLUENCE OF SOCIO-ECONOMIC FACTORS ON SUSTAINABILITY OF RURAL COMMUNITY BASED AFFORESTRATION PROJECTS, NYATIKE SUB COUNTY, MIGORI COUNTY, KENYA

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# DECLARATION

This research project is my original work and thereof has not been submitted to any university for an academic credit. No section of this work may be produced without prior authorization of the researcher and/or the University of Nairobi.

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This research project has been submitted for examination with my approval as university supervisor:

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# DEDICATION

I dedicate this work to my father Barrack Ojuok, my mother Addah Atieno and my siblings who encouraged me to pursue this course. They inspired me to work hard and always offered unwavering moral support, love and prayers through the entire study period. To my all my siblings Rose and George, I am grateful for the motivation you have always given me to be an achiever. I feel honored to be part of this family.

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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **ANOVA** | Analysis of Variance |
| **CBA** | Community Based Afforestation |
| **CBF** | Community Based Forestry |
| **CFA** | Community Forest Association |
| **FAO** | Food Agricultural Organization |
| **FGD** | Focused Group Discussion |
| **GDP** | Gross Domestic Product |
| **GOK** | Government of Kenya |
| **IPCC** | Intergovernmental Panel of Climatic Change |
| **NACOSTI** | National Commission for Science, Technology and Innovation |
| **PA** | Protected Areas |
| **PFM** | Participatory Forest Management |
| **SFM** | Sustainable Forest Management |
| **TPB** | Theory of Planned Behavior |
| **UNREDD** | United Nations REDD |
| **WCED** | World Commission on Environment Development |

# ABSTRACT

Based on the fact that agriculture is a key driver of deforestation, there is need to examine the ramifications of socio-economic factors on sustainability of rural Community Based Afforestation (CBA) initiatives. The intent of this research is to determine the influence of socio-economic aspects on sustainability of CBA projects in Nyatike sub county, Migori County Kenya. It is projected that the conclusions of this inquiry will help influence strengthening of policies, plans or programs for sustainable community-based afforestation projects in Migori County towards attainment of 10% tree cover. The study will be conducted under four broad themes that will seek to determine how income sources, people's attitude, community capacity and networks and collaboration influence the sustainability of rural CBA projects. The function of government guidelines and processes will also be investigated. This inquiry will employ a mixed design to gather data at community level both from community members at household level and members from strategic organizations that support expertise to CBA projects. A representative sample size of 396 households from the 7 wards was randomly picked from population size of 40,257 in Nyatike Sub County for questionnaire response. 20 members of CBA projects and 5 partner's/opinion leaders were engaged in qualitative data collection. The conclusions of the regression analysis disclosed a statistically significant positive relationship between income, network & collaborations, attitude, capacity and sustainability of rural community-based afforestation projects. However, the research indicated non-statistically significant relationship between government policies and sustainability. The study also confirmed that the assumptions of the two anchoring theories; the system theory and the sustainability theory hold. The study therefore recommends that there should be an increased collaboration between the rural people and external afforestation experts and government, this collaboration is likely to lead to knowledge transfer and consequently increased community participation in afforestation projects to enhance sustainability of the initiatives. The research also recommends that there should be purposeful afforestation training and mentorship to enhance the capacity of the community as well as increasing investments on afforestation related income opportunity as this is key driver of sustainable community driven afforestation initiatives. The study proposes that further research should be done to investigate the relationship between the attitude of the local people and participation in the sustainability projects. The study also proposes that further examination should be conducted to ascertain the linkage between government policies and participation in sustainability initiatives.

# CHAPTER ONE
# INTRODUCTION

## 1.1 Background of the Study

Forestry advances 6% to the added value of Gross Domestic Product (GDP) for agriculture in Hungary. The impact of Forestry not just comes from valuable production of timber items, but it is also seen in the strong contribution of forests to human development as well as ensuring a sustainable ecological balance. According to State of Worlds Forest report by FAO (2016) commercialized agriculture resulted into Latin America's deforestation by at least 70% between 2000 and 2010, however only one third in Africa where small-scale farming is a major contributing factor in deforestation. Shifting to agriculture is the main reason for deforestation, attributing to about 45% of the 7.5 million hectare's vanishing of tropical forests between 1976-1980. In 1980 deforestation covered about 70% in Africa, 49% in South-East Asia and 35% in Latin America (Thailand, Sri Lanka, north-east India, Laos, Philippines and Malaysia) (Tolba *et al.*, 1992).

Increasing global population demands for more food which leads to expansion of agricultural land and since most of the arable land fit for farming is degraded, communities are encroaching into forest land while cutting trees on farms to intensify agriculture. Demand for wood products for example in Kenya is beyond the available supply. Rural areas are key for agriculture and host most of forestland hence main beneficiaries of this resource are rural communities. Based on the fact that agriculture is a key driver of deforestation, there is need to explore the implication of socio economic factors on sustainability of rural community based afforestation initiatives.

The Intergovernmental Panel of Climatic Change (IPCC) Guidelines described afforestation as "planting of new forests on grounds that, previously, did not have forests." Other definitions highlight an alteration in land-cover "The setting up of a forest or stand in a place that the previous vegetation or land utilization was not forest" (Helms, 1998). According to Richards (2003), afforestation, an internationally accepted term, is the practice of tree planting on land that has not been utilized to grow a crop of trees lately

Globally or internationally recognized standards of sustainable forest management are being borrowed and internalized into forest management practices, thereby guaranteeing environmental protection, economic viability and social responsibility for the forest and wood-based establishments. Sound and favorable measures that comprise representation of workers and local communities are advancing, granting adaptable and accommodative approaches for forest development sustainability in a stage that was largely regulated by government authorities. Governments are progressively recognizing the functions of other players in production of wood items to satisfy the increasing demand.

Tindan (2014) in his study discovered that there was need for sustainable natural resources management, notably in Ghana's forestry section. It was found that stakeholders' involvement in sustainable management of forest in both communities encountered numerous challenges which were deeply originating from stakeholders' apprehension of what makes up a forest and the categorization of forest, that exist in the communities. These realization have established the necessary requirements for local level sustainable forest administration. In Africa, countries like Mozambique perceive forestry as a way of economic development for rural communities. This is because it helps achieve economic development through revenue generation and foreign exchange resulting from exportation of forest commodities. Forestry plantation resulted to significant land uses that impacted livelihood of many rural households who heavily relied on natural resources (Landry Janaffer & Chirwa, 2010). Kenya is enriched with a large variety of landscapes with approximately 48.6 million hectares covered by wooded land, immense areas of shrub land and barren land, and also productive section where extensive agriculture is carried out (GOK, 2002, First National Communication). To ensure the biodiversity in forests, the indigenous forests are protected. Nature's diversity i.e. with an increase in reforestation area, variety of plant and animal species can be sustained. These reforested sections also balance the ground in worn-out sections (KFMP 1994:48, 59-60). The Kenya Forest Act (2005) sets out for the institution, advancement and sustainable management, comprising conservation and rational forest resources utilization. According KEFRI publication 2014 issue 11, forest cover in Migori County was at 3% which is below the recommended 10%. The county government identified poor attitude, low awareness, climate change, encroachment for agriculture and settlement as key drivers to deforestation. Towards enhancing sustainability of afforestation projects, education and strengthened collaborations were cited as mandatory.

## 1.2 Statement of the Problem

Kumar (2009) asserts that approximately half of the planet's area originally enveloped by tropical forests has been cleared. In 30-50 years to come there may be little of such forests left. Deforestation taking place is posing threat to sustainability of ecosystems functions. The diminishing forest cover will cause soil erosion, silting of rivers and reservoirs will disturb the monsoon partners, cause floods alternating with droughts, loss of topsoil affecting agriculture and food production and water shortage. Rich tropical forests are diminishing because 1.5 billion people depend entirely on forest for firewood to meet their energy needs. The planet's woodlands and forests are gradually under pressure due to the expanding population of people and numerous are dwindling due to man-made instigated deforestation (Guthiga et al., 2006).

While studying forest, people and environment looking at the African perspective, the main drivers of land degradation were established as population increase, climate changeability, agricultural expansion, energy needs and drought (Chirwa et al., 2017). Non-forest environmental items impact rustic livelihoods positively, specifically female and the poor with regards to data gathered from 1014 family circles in Ghana and Burkina Faso. It is worth noting that forest earnings are normally little even thou richer family circles and specifically male gain higher value from forests in comparison to other groups. Income from the environment also serves as a buffer for families undergoing crises resulting from death or illness of an high-yielding household's member, but supposedly not when cropping fails (Pouliot & Treue, 2013). According to Sloan & Sayer, (2015), forest gain is transpiring at higher latitudes and in wealthier nations while forest loss keeps up in poor nations in the tropics largely dominated by African countries.

In 2009, deforestation stripped Kenya's economy of 6.6 billion shillings and in 2010 an additional 5.8 billion shillings ($68 million), surpassing the approximate 1.3 billion shillings earned from logging and forestry every year as stated in UNREDD (2012) report on The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy. Some of the key issues causing deforestation in Kenya include charcoal burning, unlawful logging, and forests encroachment from human settlement and agriculture. National Forest Resources Assessment and Mapping report (KFS 2013), cites that the forest cover in Kenya was 6.99% in 2010. This is below the recommended global standard of 10% also referenced in the Kenya Constitution (2010).

In Migori County, forest cover spanning several hectares are lost each year because of unlawful logging, settlement, cultivation, encroachment, and development projects in forest reserves. Additionally, inappropriate forest resources utilization, forest fires, inadequate capacity to value forest product and services, lack of harmonized policies on managing of trans-boundary forest resources and absence of forest zoning continue to be a challenge. Nyatike sub county area is semi-arid and pose all the features of an emerging desert, having protracted dry spells and short erratic rains. Major forests like Got-kachola and Nyatike are getting deforested alarmingly because of production of charcoal, human encroachment and settlements, and logging (UNCCD May 2016 report). Despite the communities deriving forest products including timber, herbal medicine, fruits, poles and posts, wood fuel and charcoal, afforestation habit is still unsatisfactory but steadily on the rise in as a result of improving forest product prices in the marketplace. Those engaged in farming of trees normally amass incomes through sale of posts, fire wood, charcoal, timber and poles.

To reinforce forest conservation and sustainable forest resources' management efforts, it is crucial to ascertain local community and other stakeholder's involvement by undertaking participatory forests management techniques and that all national guidelines and strategies must display the forest section put apart for forest protection and in the sustainable production of forest products and services. Studies have been done on afforestation, though very little has been done on socio economic factors impacting sustainability of rural community-based afforestation programs in Migori County. This has resulted to decreased forest cover over the years hence socio-economic factors influencing afforestation have to be considered to enhance success of rural reforestation programs especially in Nyatike Sub County.

### 1.3 Purpose of the Study

The aim of this research was to institute the effect of socio economic indicators on sustainability of rural community based afforestation projects in Nyatike sub county, Migori County in Kenya.

### 1.4 Research Objectives

The below objectives directed the research;

1. To ascertain how income sources affect sustainability of community-based afforestation (CBA) projects in Nyatike, Migori County, Kenya.

2. To determine the extent to which local people attitudes affect the sustainability of community based afforestation (CBA) projects in Nyatike, Migori County, Kenya
3. To establish how community capacity influence the sustainability of community based afforestation (CBA) projects in Nyatike, Migori County, Kenya.
4. To assess the level at which networks and collaboration impact sustainability of community based afforestation (CBA) projects in Nyatike, Migori County, Kenya.

### 1.5 Research Questions

The inquiry was to provide solutions to the below requests;

1. How do income sources impact sustainability of community-based afforestation projects in Nyatike, Migori County, Kenya?

2. To which degree does local people attitudes influence the sustainability of community-based afforestation projects in Nyatike, Migori County, Kenya

3. How does community capacity influence the sustainability of community-based afforestation projects in Nyatike, Migori County, Kenya?

4. To what level does networks and collaboration influence sustainability of community based afforestation projects in Nyatike, Migori County, Kenya

### 1.6 Research Hypotheses

The research was guided by the hypotheses below;

1. $H_{01:}$ There is non-significance interconnection between income sources and sustainability of community based afforestation projects, Migori County, Kenya
2. $H_{o2}$: There is no significant association between people's attitudes regarding afforestation and sustainability of community-based afforestation projects, Migori County, Kenya
3. $H_{o3}$: There is non-significance association between community capacity and sustainability of community-based afforestation projects, Migori County, Kenya
4. $H_{o4}$: There is no significant relation between networks and collaborations and sustainability of community-based afforestation projects, Migori County, Kenya

## 1.7 Significance of the Study

It is anticipated the investigation's outcome will help influence strengthening of policies, plans or programs for sustainable community-based afforestation projects in Migori County. Also, it will help governments, development agencies and private sector better support community driven afforestation initiatives in similar contexts with Kenya and out of the country regionally or globally. Forest administrators can use findings and conclusions of the study to increase efforts to reversing land degradation as well as attaining the 10% intended tree cover. Researchers and other scholars can utilize this research's outcome as new knowledge source and research idea and further research areas recommended for exploration (research ideas).

## 1.8 Delimitation of the Study

The inquiry is purely for academic purposes. The research was limited to investigating the effect of socio-economics aspects on sustained rural community based afforestation initiatives in Nyatike Sub County, Migori County, Kenya. According to Migori County 2013-2017 CIDP report, there has been consistent decline in forest coverage over the years due to growing settlement demand, cash crop (largely sugarcane and tobacco) and subsistence crop farming. Nyatike sub-county being the worst affected due to the gold mining activities continuing to leave land derelict. This has resulted to environmental deterioration and dwindling water levels in water catchments. Major challenges to forests protection in the county include insufficient knowledge on prominence of preservation, charcoal burning, and regular wild forest fire outbreaks, outlawed logging and firewood for tobacco curing. Out of the overall population, the percentage of individuals involved in forest activities is only 16 per cent. The target population will be restricted to environmental groups within Nyatike Sub County in Migori County. Data collection implored the use of qualitative and quantitative methods.

## 1.9 Limitations of the Study

These comprise elements that might impede or delay the research and encompass: Time and money limitation: Time may not be sufficient to collect all required information and analyze. Also, due to limited resources for the census of targeted stakeholder of afforestation programmes, nursery operators, county government officials in ministry of environment.

The study faced the challenge of collecting demographic information about the respondents. Female respondents were reluctant to disclose their age, the male respondents were also not very comfortable disclosing their marital status. Some of these challenges were identified during the pilot period and fixed. For example, the questionnaire provided for an option of filling in the age brackets instead of giving the absolute age. The marital status was also coded with friendly options which eliminated the necessity to disclose the number of wives that a respondent has.

The researcher also faced the challenge of collecting information about the household income, most of the respondents running small and medium enterprises were uncomfortable because they thought that the information about household income may reach KRA. The respondents also did not want a public display of their wealth. The researcher resolved the challenge by promising anonymity, the researcher also explained that the data collection was only done to fulfill the research obligation of the University of Nairobi. The researcher explained that there was no connection between KRA and the research. Moreover, this information was collected in utmost privacy.

### 1.10 Assumptions of the Study

The inquiry was premised on the supposition that the interviewees will willingly engage in the research and respond to the inquiry accurately and honestly. The interviewees will be very compliant, and the questionnaire return rate will be 100%.

### 1.11 Definitions of Significant Terms as used in Study

**Afforestation** refers to conversion of barren land with no or minimal trees into forestry land.

**Community capacity** is the ability of the community to engage in and support afforestation based on the available resources within their reach e.g. land, skills, water, capital, inputs etc.

**Local people's attitude** refers to community perspective of viewing development projects relating to forest conservation or afforestation.

**Networks and collaborations** is the act of working together for achievement of desired objectives while leveraging on each other's strengths. Communities working together with partners either from government or non-governmental organizations are an indicator of good relationships that can impact positively to afforestation.

**Rural Afforestation projects**: Refers to the tree planting activities undertaken by farmers either individually or as groups including plans put in place regarding planting of trees/tree protection by partners in the rural areas

**Socio economic factors in afforestation** refers to social and economic benefits, spanning from simple quantified economic values linked with forest items, to less palpable services and society contributions.

**Sustainability of afforestation** projects is the ability of a community to benefit from the forest resources today without a concession on the potential of the generations to come benefiting from the similar resources. This calls for key involvement by motivated farmers and partners to support afforestation in an enabling policy environment.

### 1.12 Organization of the Study

This inquiry was structured in five chapters. In Chapter One, the introductory chapter, entails the background of the research, statement of the problem and the research' objectives amongst other introductory topics. Chapter Two is the Literature Review that puts forward both theoretical and empirical studies, research gap and conceptual framework. Chapter Three is the Research Methodology. It provides the design, data collection instruments and procedure, information on how data scrutiny and presentation will be conducted and ethical considerations. Chapter Four entails data analysis, presentation and interpretation. Finally, Chapter Five is summary, conclusion and recommendations. This chapter entails a summary of the main findings of the study, discussions on the findings against information in the literature and puts forward a conclusion and recommendation for further inquiry.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

This chapter provides an outline and a fundamental evaluation of relevant literature. It also offers a theoretical and conceptual underpinning on the function of socio economic factors on sustainability of local community-based afforestation projects as well as identifying gaps that warrant further research thus giving this study a basis.

Globally, there is an extensive support for the conviction of sustained development and the inclusion of its three cornerstones: environmental preservation, social development and economic development. Forest stewardship council established considerable difficulties linked with fully integrating and operationalizing social sustainability elements in diverse sections (Boström, 2012). To intensify benefits to local community from Forest Landscape Restoration (FLR), it is imperative to better incorporate political and socioeconomic statistics into FLR forethought and execution, to intensify the purpose of informational enforcement, and to advance surveillance and assessment procedures to gauge primary and secondary environmental and social repercussions from FLR ventures (Erbaugh & Oldekop, 2018)

## 2.2 Community Based Forestry – A Model for Sustainable Forestry in Kenya

Kenya is faced with deforestation at an alarming rate. With an expansion in population, demand for arable land rises, giving rise to excision of forest regions. In a span of 10 years, the country's forest cover has declined by nearly half from 3% to 1.7% of the total land cover (FAO, 2018). Furthermore, the sawmills in operation has dropped from 450 in number to slightly below 10 in the same duration. As a retaliation measure to this crisis and an effort to stabilize environmental, social and economic concerns, the Kenya Forestry Project, which comprises collaboration by three unions has proactively participated in measures meant to warrant development and growth of wood and human resource. The initiatory endeavors to unite efforts of trade unions, government agencies, industrialists and local communities to collaboratively oversee forest and wood resource to sustain livelihoods and improve revenue generation to the local populace.

Community-based forestry (CBF) popularity has risen on the basis that local inhabitants, when bestowed with reasonable property rights upon local forest, can marshal autonomously and establish localized institutions to control natural resources usage and

sustainably manage them. In due course, varied forms of community-based forestry have come up in various nations, having at heart the idea of some level of engagement by smallholders and community clusters in planning and execution (FAO, 2016). Estimates from the literature supposes that CBF system encircles about 732 million hectares, translating to about 28% of the forests among the 62 countries evaluated across all regions, Kenya included. The forest coverage in the 62 countries constitutes 65% of the world's forests (according to FAO's estimates from Global Forest Resources Assessment 2015 of 3 999 million hectares of world forest cover in 234 nations and territories).

CBF consist of social, economic and conservation facet in an array of undertakings comprising of devolved and regionalized management of forest, smallholder forestry programs, community-enterprise partnerships, small-scale forest-based establishments and indigenous control of sacred sites of cultural value. In this assessment, CBF is considered to encompass both collaborative arrangements (forestry practiced on land with some form of formal communal occupancy and requires collective efforts) and smallholder forestry (on land that is usually privately owned).

Notwithstanding the lack of extensive national-level data, there is increasing proof that CBF is a worthwhile forest management modality that can contribute to sustainable forest management (SFM) and enhance local livelihoods (Gilmour, 2016). Stable and effectual CBF systems are also hardy with ability to endure internal and external shocks, as well as the unforeseeable impacts linked to climate change. Generally, smallholders and communities have proven in many ways that they are capable and have the willingness to manage forests sustainably, creating substantial economic and other gains. Nevertheless, the full possibilities of CBF is yet to be achieved in most nations with existence of several hurdles hindering effective implementation.

### 2.3 Influence of Socio-economic Factors on Sustainability of CBA Projects

Regardless of the vital and critical task forests' undertake in maintaining indispensable purpose in human welfare and in the ecosystem, the procedure of transforming forested area to varied land usages like cropland, mining, pasture and urbanization is continual (Keenan *et al.,* 2015). Deforestation has resulted into deterioration of quality and the extent of ecosystem services worldwide thereby minimizing biodiversity, weakening the flood retention ability and soil stability along with generating negative implications on local communities and local economies (Wagner, Yap & Yap, 2015). Taylor and Garcia-

Barrios (1995) concluded that inquiries into environmental change of emerging nations should put consideration on the localized economic and social context implicated in populace and social change, instead of populace alone. Varied socioeconomic, demographic, biophysical, cultural, political and technological determinants, acting independently or synergistically, revitalize the anthropogenic functions of the players leading to deforestation or degrading of forest (Angelsen & Kaimowitz, 1999; Kissinger, Herold & Sy, 2012). These deforestation determinants differ across geographical areas and historical backdrop. This review describes the role of four key socio-economic factors in the sustainability of community-based afforestation initiatives as follows.

### 2.3.1 Income Sources and Sustainability of Community Based Afforestation Projects

Liu and Huang (2013) argue that the cost and advantages which amass from adopting conservation technologies strongly shaped farmers' choices on adopting them. Business is the basic source for comfortable and smooth social life in the rural setting. Several investigations into forest-livelihood nexus have denoted the vital role forests play in achieving sustenance and diversification of livelihood in addition to alleviating poverty (Mukul et al., 2016). Richard et al. (2011) following a study on causes of deforestation concludes that deforestation existing in reserve are firmly embedded in the everyday income demands of communities and the swelling populace. Moktan et al., (2016) established that local forestry makes contributions to family circle earnings by harvesting and promoting huge trees and non-wood forest items within market reach. Household earnings, nevertheless, differ extensively between poor and rich family circles with the latter maximizing on profit-oriented and former on sustenance products. This therefore implies that while benefits from afforestation can act as catalysts to tree planting, extreme poverty can also be a driver of deforestation thus leading to unsustainable forest management. Availability of a range of business opportunities is also imperative as high earning level often guarantee good life standard.

In accordance with World Bank report of 2012, entrepreneurship performs an integral part in local development. The entrepreneurial reference point to rural development acknowledges entrepreneurship as the focal point of economic growth and development, in its absence other development factors will be wasted. The endorsement of entrepreneurship as a focal development point by itself will not result to rural development and the progression of rural enterprises. Bhandari (2010) states that in

Nepal, forest belonging to the community has been an employment and income source for local communities particularly by cultivating non-timber forest items, cash crops intercropping, herbal medicines, sales from seedlings and arranging for tourism in rural forests.

There is an urgent demand to empower environment entrepreneurship in local areas. The presence of such an environment relies on guidelines encouraging rural entrepreneurship. The success of such guidelines in turn relies on an intangible framework concerning entrepreneurship. A general concurrence between scholars Fuller-Love, Midmore, Thomas and Henley (2006) and Frazier, Niehm and Stoel (2013) is that rural entrepreneurship is one of the most vital strategic components for local economic development. Nonetheless, there is no literature on whether income sources in the rural set up have an influence on forest sustainability have even though Choudhary (2018) observes that rural entrepreneurship guarantees value addition to rural assets in local areas by engaging huge local human resources. Imedashvili *et al.*, (2013) affirms that entrepreneurship is a proven pathway to build income, independence and financial security for persons, families and communities; and that income sources play a particularly indispensable role in rural communities by creating new jobs and supporting the economic and social wellbeing of communities. This study hypothesizes that income sources affect durability of community-based afforestation initiatives in Migori County.

### 2.3.2 Local People's Attitude and Sustainability of Community-based Afforestation Projects

Tesfaye (2017) in a study assessing local community attitude and apprehension regarding participatory forest management (PFM) structure and its inference for sustainability of forest state and sustenance in West Shewa zone, Oromia, Ethiopia; argued that for local inhabitants to cooperate to reduce forest degradation and deforestation, they should possess a positive apprehension with regards to forest preservation arrangement and positive school of thought with regards to forest preservation viewpoint. A positive perspective of local communities as regards forest administration arrangement is an indispensable requirement for local involvement in forest administration. The study findings revealed statistically significant dissimilarity between villages regarding supportive viewpoint toward forest preservation arrangement ($p=0.02$) and with regards to PFM System ($p=0.01$). Approximately half of those interviewed held a positive viewpoint as regards to conservation project while respondents who were highly reliant

on the forest to generate earnings stayed hesitant and negative, indicating high support levels with regards to a conservation initiative by fractions of the locals might not interpret conservation successful outcome.

Elsewhere in Kosti Province-Central Sudan, almost all the respondents (99%) in a study that evaluated local people attitude regarding locality forestry practices had a particularly favorable viewpoint of the community forestry action plans executed and they perceived the best management type for administering these forests that was to be possessed and administered by them. They took part in various programme undertakings and were inclined to further their involvement in activities of planting trees. Women possessed positive school of thought in regards to community forestry compared to men despite not being totally engaged in community forestry activities (Kobbail, 2011).

Development in scientific literature reveals that restrictions placed on resources utilization normally leads to negative viewpoint amongst local inhabitants and difficulties in the management of the protected areas (PAs) (Kideghesho *et al.,* 2007; Fiallo & Jacobson, 1995; Larson *et al.,* 2016; Andrade & Rhodes, 2012). Furthermore, reliance level of local inhabitants on natural resources (Marshall, Marshall, Abdulla, & Rouphael, 2010; Baral & Heinen, 2007; Sah & Heinen, 2001) and the supposed gains that PAs impart to local community (Allendorf *et al.,* 2006) have also been found to affect their viewpoint and actions toward these protected areas.

In the light of the social-psychological framework like the theory of reasoned action and by large, the Theory of Planned Behavior (TPB) (Ajzen, 2012), behavioral intent result from a blend of a person's viewpoint, a check on supposed behavior and norms. These resolutions can therefore forecast clear-cut behavior (Ajzen, 1991). Additionally, a broad range of backdrop elements can impart viewpoint, norms, and supposed behavioral check, in particular demographic and socioeconomic drivers, common attitudes and principles, previous experience, and cognizance (Ajzen & Fishbein, 2005). Contextual considerations like legislations and government directives may as well interact and ascertain a behavior (Stern, 2000). As per TPB, a viewpoint is contemplated as the extent to which an individual has a positive or negative assessment of a particular behavior. Expressive norms describe perception of how other individuals carry out themselves, comparatively to what is allowed or not by people (St John *et al.,* 2010; Cialdini &

Goldstein, 2004) and supposed behavioral check is the perception concerning the simplicity or difficulty of effecting a behavior (Ajzen, 1991).

Some research have demonstrated that school of thought can be better behavior indicators, in the circumstances of comprehension of cultural, social, and economic considerations (Holmes, 2003;Abbot, Thomas, Gardner, Neba, & Khen, 2001), whilst other scholars have proposed that school of thought may not definitely translate into pro-conservation behaviors (Waylen, McGowan, & Milner-Gulland, 2009; Infield & Namara, 2001). Nevertheless, attitudes are simply amongst the factors affecting behavioral objective, and specificity is essential in predicting a behavior better (behavior and attitude should be aligned and precise).

### 2.3.3 Community Capacity and Sustainability of Community-based Afforestation Projects

Chaskin (1999) describes community capacity as sociability of human, social and organizational capital existent within a specified community and may be capitalized on to address problems jointly and enhance or sustain a community's well-being. It can function via informal social procedures and/or structured measures by people, establishments, and the networks of relationship between them and amongst them and the wider structures that which the community contained in.

A community with capacity is distinctively favored with varied kinds and magnitude of resources, physical infrastructure, services, jobs, housing, education, income which may be utilized by its population (Massey & Denton, 1993). More informal and significant ties keep on operating at the rural level, even so, these are varied experience by various persons. Where the essential facilities, establishments, and services are unavailable, where serious impediments to engagements in networks of relations within the locality due to, for instance, fear of victimization and crime, residents with the ability, may try to focus activity and association outside instead of within the locality.

A framework by Atkinson & Willis (2006) suggest four core features of community capacity: (1) consciousness of community which relates to the level of connectedness amongst members and acknowledgment of interdependency of circumstance; (2) a degree of commitment among community members with focus on certain persons, groups, or establishments that are accountable for what transpires in the locality and investment on

energy, time and diverse resources in advancing its wellbeing. Under this component, community members perceive themselves as actors in the joint prosperity of the locality and express preparedness to undertake the role actively. (3) Mechanisms of problem solving which involves the potential to resolve issues, recognize priorities, and figure out difficulties; and (4) resources accessibility including human, economic, physical, and political outside the locality.

Diverse communities may possess various levels of each of the above components, and many communities will hold some positive degree of all the four. Even thou, the presence of such features is a question of degree, probable threshold proportions exist along the continuum which are essential for the community to attain specific ends such as resources management. Merzel & D' Afflitti, (2003) notes that while communities' features may impede measures in tackling social concerns, the type of community relations can also form part of the solution. Viewpoints on community capacity are premised on finding a common position in advancing community solutions. Procedures that harbor and consolidate diverse perspectives by way of consensus - based, cooperative approach are highly appreciated. According to Raeburn *et al*., (2007), the key propositions are exemplified by self-determination, equity and participation. The degree to which homogeneity in a community will pose a substantial effect in the ease or difficulty in encouraging wider connectedness amongst members of the community and on the enhancing community capacity. Additional undiversified localities may find it smooth to create a feeling of belonging and sense of trust. In the contrary, homogeneous localities maybe faced with the absence of varied perspectives intrinsic in more heterogeneous environments, thwarting the long -term advancement of a civil society.

### 2.3.4 Network and Collaboration and Sustainability of Community-based Afforestation Projects

Network and collaboration are acts of working mutually. The mutual effort of varied people or work groups to achieve a project or duty. In human services these two terms can mean the joint efforts by two or more representatives or service providers for purposes of serving their participants better and accomplish outcomes they cannot realize by working in solitude. At the community level, the concept of network and collaboration often seek to respond to the question, where does community capacity dwell and how is it occupied? Thus, acknowledging that community capacity is occupied by way of

combining three social interaction levels: an individual, establishments, and networks of collaboration.

According to Goldring & Sims, (2005) the personal level discusses the comprehension, skillset and resources of personal inhabitants in the locality. Such aspects have been identified as human asset, and contributions in growing individuals' human capital can pose immense effect in their potential to amass resources and enhance their economic welfare. For residents to exist within communities of human capital leads to community capacity via its accessibility as a joint resource and via, personal contributions.

The establishments levels emphasize on systematic collectivities, with inclusion of local-based establishments (businesses, service givers and development bodies), local divisions of bigger establishments like schools, banks, major retail enterprises and smaller, systematic groups like local social associations and clubs. Community capacity at this juncture could be mirrored in the potential of these collectivities to undertake their activities harmoniously, efficiently and effectively being part the wider structure of parties and procedures that they are linked to, inside and outside the locality. Relevant benchmark for gauging organizational capacity i.e. the potential of an enterprise to successfully attain its objectives, may deviate considerably from enterprise to enterprise based on the kind of its work (Tamayo, 2017). The enterprises level can be viewed as an element of and instrument for establishing community capacity, such benchmark are probable of going outside a simple production outcomes accounting to integrate challenges of constituent representation, political supremacy, and the potential to take part in instrumental, inter-institutional relations (Merzel & D ' Afflitti, 2003).

Networks of association relates to social layout, that is, networks of relations amongst people and establishments or other collectivities. Among people, the extant systems of positive social link amongst players that yield a backdrop of trust and support and constitute resources accessibility including information, interrelatedness, and money is referred to as social capital (Tamayo, 2017). In the confines of community surrounding, the impression of social capital may be expanded to include establishments functioning as intersections within structural scope (Sciabolazza *et al.,* 2017), whereupon an framework of instrumental association (that assumes several shapes) supplies individual establishments with wider resources access and a socially defined backdrop that apprise decisions made in an establishment and structures correlation among them. Whilst there is

existence of human capital and organizational capacities inside individual intersection of a social network, social capital and its equivalent amongst establishments are collective occurrences, intrinsic in the structure correlation inside the network.

Network linkages are diverse in scope, strength, use and function (Tamayo, 2017) and are unevenly apportioned among players in a structure. While numerous strong linkages may be proof of wider social coherence in a community, weak linkages that make reference to less deep-seated and fervent associations that incline to bridge the gap between players with social network linkages that do not substantially intersect, are key in linking the community to other sources of information, influence and resources (Sciabolazza *et al.*, 2017). Individuals or establishments that operate at the connection point amongst divergent networks have the ability to wield notable impact and power inside the community; as middlemen within the arrangement, they are better placed to broker dealings as they have wider accessibility to timely information in addition to significant authority over information and opportunities as they emerge.

### 2.4 Theoretical Framework

This part will look at the hypothesis which anchor the research, the theories which will be reviewed include, the system theory and sustainability theory. The section will look at the assumptions underlying the theories and link the theories to the concepts of the study.

#### 2.4.1 The System Theory

System theory is amongst the hypotheses that has attained reputation in various disciplines. This theory has its backdrop in science trailed back to 1968 and several researchers have tied it to Von Bertalanffy, who is a biologist, employed it as a rationale for the research field familiar as general system theory. It entails scrutiny of multidimensional disciplines to comprehending a problem. In the discussion, this hypothesis made provisions that any technique to solving problems comprising community development schemes must contemplate the systematic reasoning in a point one perceive any living enterprise affected by other numerous elements from both inside and beyond (Midgley, 2003 & Kerzner, 2006). This hypothesis recognizes the balancing task between individuals and their character or habitat (Mbiti.1996). In their discussion, the proposers of system hypothesis postulate that for whatsoever sustainable development to happen one must contemplate the interchange of varied elements intrinsic to the habitat.

In the backdrop of this research, sustainability of community-based afforestation initiatives entails structured and logical procedures that presupposes several interactions namely income sources, local people attitudes, community capacity and networks and collaboration. The intention supporting a system hypothesis is that persons, groups, bodies and establishments and other institutions be it man-made or naturally occurring do not exist in solitude. As environment inhabitants, they live in an habitant identified with diverse and complex inter-relationship (WCED, 1997 & Midgley, 2003). As concerns this research and in correspondence to system hypothesis, comprehending how afforestation projects are sustained in a community is a system residing within diverse systems and therefore is critical in tackling the questions of community capacity, networks and collaboration, local people attitude and income sources in relation to community based afforestation project sustainability.

System theory dispenses an investigative guideline that can be utilized to define some of the several elements engaged in community-based projects (Tamas, 2000 & Whitehorse, 2000). Amongst the key matters in community-based initiatives, such as gauging power and authority, comprehending the dynamics of intergroup associations, and taking into considerations the adjustments associated with organizing development proceedings, may be acknowledged and defined using system hypothesis. Community project administration capacity, existent community advancement structural guidelines, environment and community-based organizational make-up are amongst the system components through which community projects run but inside a macro approach that affect them. These elements jointly together with those not addressed in this research may connect to determine sustainability of community development initiatives.

### 2.4.2 Sustainability Theory

The notion of sustainability maybe be unearthed from 1970 and later became popular through world commission on environment development (WCED) a segement of United Nations. The notion is premised on economic hypothesis referred to as environmental limit whose brainchild was Thomas Malthus (1766-1834) & David Recardo (1772-1823). The discussion in their hypothesis is that resource found in the habitat are limited (White, 1996 & WCED, 1997). In the WCED report known as our common future, the notion of sustainability and sustainable development began to materialize and thereafter popularized through environmental preservation. As reported by WCED, sustainable development is an advancement that caters for the requirements of present-day generation

without a trade-off on the capability of the upcoming generation to fulfill their own wants (WCED, 1987). In the backdrop of this research therefore, the notion sustainability concerns individuals with the ability to preserve and uphold the community-based afforestation measures using their personal resources or assets without having a middle ground on the wants of future generation.

The requirements for sustainable development is a global concern. Nevertheless, for one to understand what sustainable development is, awareness of what is crucial for the practicability of the methods and how it adds to sustainable development is essential. When gauging the community capacity in administering projects comprehending sustainability concerns is crucial. The capacity of a locality to handle an initiative in itself is a measure of sustainability. When contemplating the protagonist of sustainability hypothesis, any capacity building game plan need to scrutinize the interconnected character of both the confined and wider networks that is also a system-wide factor as reviewed above. The sustainable development hypothesis demonstrates that the interest of sustainable development is managing the change process, and not fixing an end objective with predetermined results. It acknowledges existence of uncertainties thereby demanding adaptable and ongoing proceedings. It also reinforces multiplicity and differences within the rural environment.

In this hypothesis, sustainable development demands a wider global viewpoint and local measures of communities, whilst continuously thinking crucially about and refining the little complexities of the relations that eventually mold these communities. Projects administration demands three central competencies that is; behavioral, technical skills and contextual. With regards to sustainability technique to community development, project managers and team players demand contextual proficiency to a greater degree and not leaving out behavioral and technical proficiency (Beata, 2014). A review of the study focus, sustainable development theorist enlightens that in order to establish community requirements and concerns, there is a need to establish community preferences and stabilize conflicting interests. From this argument, individuals and their social associations must be engaged in the community design procedure to raise the chances of attaining a successful and lasting after-effect as long-term change normally originate from local involvement (Nyaguthii & Oyugi, 2013).

Several better plans of action stall since the advocators never took time to evaluate community capacity or asset before carrying out the plans. Long-run sustainable development objectives should attempt to empower individuals, raise community liasion, nurture social cohesiveness, strengthen cultural identity, bolster institutional development, and foster equity and fairness.

### 2.5 Conceptual Framework

The problem under inquiry in this research is set an inquiry into the effect of socio-economic factors on sustainability of community-based afforestation projects. This research is built from four independent variables; income sources, people's attitude, community capacity and networks and collaboration. These parameters are utilized to predict the dependent parameters which is sustainability of community-based afforestation projects. Nonetheless, the elements are probable of affecting the predicted relation include government policies and regulatory guidelines as the moderating variable. The conceptual framework of the parameters under inquiry is as depicted in figure 2.1.

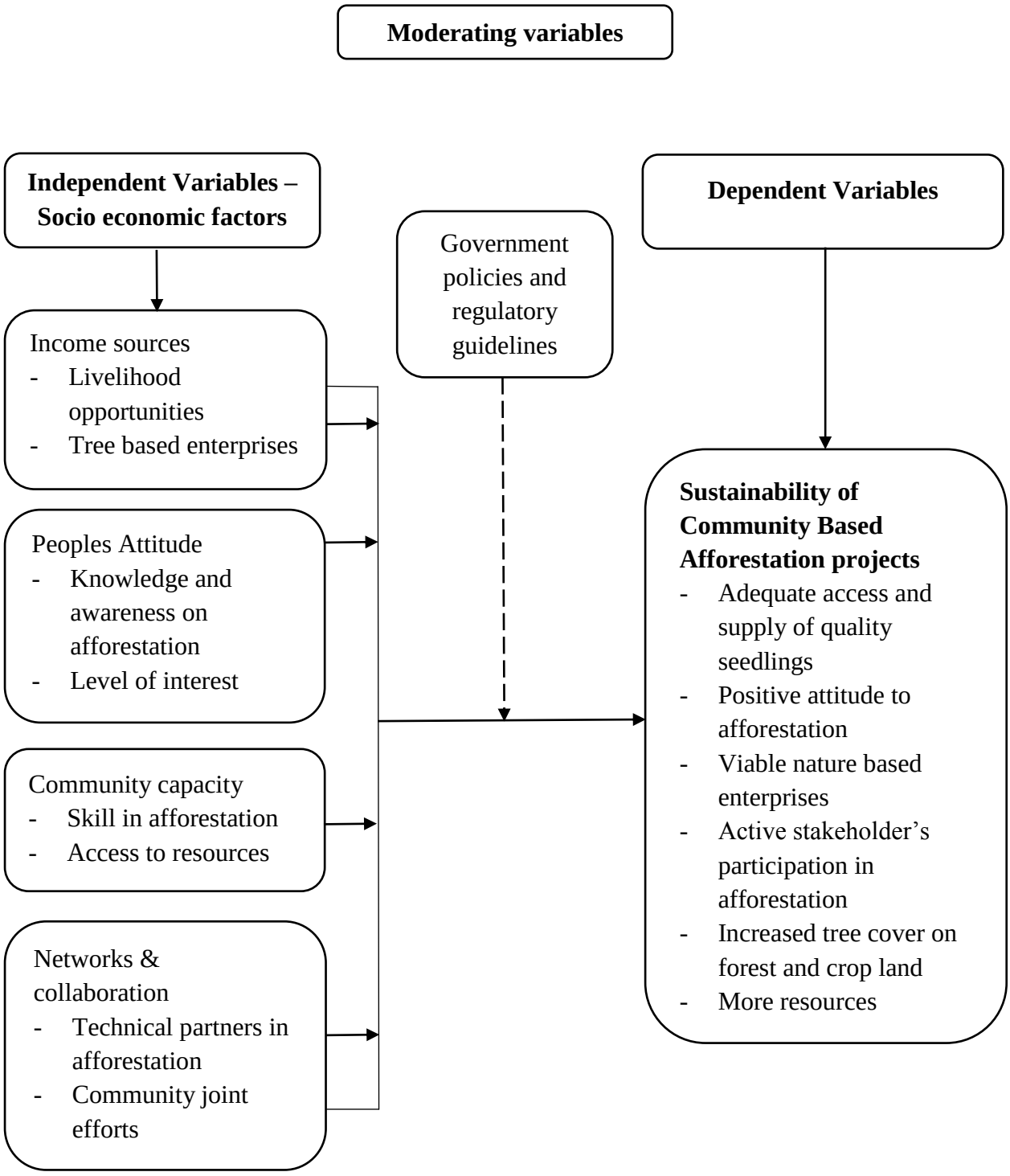


**Figure 2.1: Conceptual Framework**

## 2.6 Knowledge Gap

**Table 2.1: Knowledge Gaps**

| Variable | Author, Year of Study | Title of study | Findings | Knowledge gap | How the Study Addressed the gap |
|---|---|---|---|---|---|
| Sustainability of community based afforestation projects | Schirmer, J., & Bull, L. (2014). | Assessing the likelihood of widespread landholder adoption of afforestation and reforestation projects. Global Environmental Change. | Widespread adoption of afforestation projects demands scheming afforestation so it (i) provides a variety of socio-economic advantages that go outside earnings; (ii) reduces interference to land management flexibility; and (iii) is harmonious with landholder principles about proper utilization of agricultural land | Previous studies did not look at sustainability of rural based afforestation projects in Migori county | The current study looks at sustainability of afforestation initiatives in a rural set up; Nyatike in Migori county |
| Income levels | Khan N, 2019 | Socioeconomic impacts of the billion trees afforestation program in Khyber Pakhtunkhwa Province (KPK), Pakistan | Founded on perception-based analysis and cost-benefit analysis, it was established that the afforestation project positively influenced the economic situations of local households and the community livelihood rose during the program, with a total net income of 6.9 million USD in the three districts of KPK. The research also examined a gender inclusive involvement | The previous studies did not explore the sustainability of rural livelihoods as one of the main concerns related to sustainable afforestation in Migori county | The current study concentrates on sustainability of the rural forest related livelihood as one of the dependent variable. Sustainability is the main variable in this study. |
| Local peoples attitude | Tesfaye (2017) | Assessment of Local Community Perception of and Attitude Towards Participatory Forest Management (PFM) System | Examined local community viewpoint and attitude about participatory forest management (PFM) plan and its repercussion for sustainability of forest | The previous studies did not explore the influence of local peoples attitude on | The current study has looked at the impact of people's attitude sustainability of |

| | | | | | |
|---|---|---|---|---|---|
| | | and Its Implications for Sustainability of Forest Condition and Livelihoods | condition and livelihoods in West Shewa zone, Oromia, Ethiopia; He found out the power of positive perception towards forest conservation system and positive attitude toward the forest conservation technique. | sustainability of afforestation projects in Migori county | afforestation projects in Migori county. The contextual gap has been solved by setting the current study in Migori Kenya. |
| Community capacity | Magugu et al., 2018 | Socio-economic factors affecting agro-forestry technology adoption in Nyando, Kenya | Established that adoption of agroforestry would be more strengthened with an apparent focus on extension undertakings, income boosting afforestation actions and soil amelioration technologies. | The previous studies did not explore the influence of community capacity on sustainability of afforestation projects in Migori county | The current study addresses the problem by including community capacity in afforestration as one of the independent variables. |
| Networks and Collaborations | Sciabolazza *et al.*, 2017 | Detecting and analyzing research communities in longitudinal scientific networks. | Established that while multiple strong ties may be proof of wider social coherency in a community, weak ties that make reference to less intimate and intense associations inclined to serve as a link between players whose social network relations do not notably overlap, are influential in linking the community to other information sources, resources, and influence. | The previous studies did not explore the influence of networks and collaborations on sustainability of afforestation projects in Migori county | In the current study the impact of networks and collaboration has been looked at as one of the independent variables. |

# CHAPTER THREE
# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter defines the methods selected for this inquiry. Research design, target population, sample size and sample selection, are covered in this study. Additionally, data research instruments, validity, reliability of research instruments, data collection methods and data analysis techniques are all covered in this chapter.

## 3.2 Research Design

This research employed a mixed approach design to gather data at community level both from community members at household level and members from strategic organizations that support expertise in community-based forest initiatives. Mixed methods investigation is a research technique that blends or links both qualitative and quantitative forms and offers scholars across research jurisdiction with a meticulous technique to responding to research inquiry (Aramo-Immonen, 2013). At household level, quantitative data were gathered using questionnaires. Key informant interviews were conducted with government officials, opinion leaders and members from non-governmental organizations that support CBA initiatives in Nyatike Sub County. Focus group discussions will be conducted with members of environmental groups that support CBA initiatives in Nyatike. This design is preferred since it allows the researcher to tackle a broader range of the research questions from both the perspective of the community, opinion leaders, the government, NGOs and community based organizations at the same time. Stronger evidence will be obtained in the event of similar findings from the different groups. Thus, the study will ride on the advantage of complementarity aspect of the two approaches.

## 3.3 Target Population

The target populace for this research was 40,257 households of Nyatike Sub County who make the population about which this study aims to make inference. This was the sampling frame from which the sample for quantitative data was drawn. The study also focused on five strategic partners that support community based afforestation initiatives forming a basis for key informant interviews. Lastly, community forest association members and environment groups in Nyatike Sub County were engaged in focus group discussion. The study focused on 5 senior staff/opinion leaders from the organizations and 21 from the community forest association/environmental groups.

### 3.4 Sample and Sampling Procedure

This part reviewed the computation of sample size and the sample procedures which were followed to select the appropriate representative sample size.

#### 3.4.1 Sample Size

A sample refers to a cluster from which data is obtained and the outcome after scrutiny can be utilized to constitute a generalization around a populace (Kothari, 2004; Mugenda, 1999). These two authors argue that through selection of some aspects in a population one may draw inferences about the whole population from a sample.

In order to determine the true proportion at 95% confidence level, a statistical formula for sample size determination by Yamane (1967: 886) was used to compute the community households only sample size for quantitative data collection as follows:

$$n = \frac{N}{1+N(e)^2}$$

Where:

n = Desired sample size, N = Target population size with characteristics being measured, e = Degree of precision usually set at 0.05. Therefore,

$$n = \frac{40257}{1+40257(0.05*0.05)}$$

$$n = \frac{40257}{101.6425}$$

n = 396 households

For qualitative data, 5 key informants will be recruited from the partner organizations. In addition, 21 members of the community forestry associations were engaged. In total, 26 participants were involved in qualitative data collection.

#### 3.4.2 Sampling Procedure

Simple random sampling was applied to choose eligible households to whom the questionnaire will be administered. Participants aged 18 years and above were considered because of their ability to consent independently. Only one participant was considered from each household. All the 7 wards of Nyatike Sub County were included in the study. Table 3.2 reveals the sample size (number of households) from each of the wards. This was proportionately obtained using the formula.

$$\frac{Total\ no.\ of\ HH\ in\ the\ ward * Total\ Sample}{Total\ no. of\ HH\ in\ the\ sub\ county}$$

Purposive sampling was employed to recruit participants for interviews and focus group discussions. Table 3.1 depicts the sample size by respondent category.

**Table 3.1: Sample size by respondent category**

| Respondent category | Sample size |
|---|---|
| Community members | 396 households |
| Woman Environment Champion in Nyatike CBO | 1 key informant |
| Kenya Forest Research Institute (KEFRI) – Migori County | 1 Key informant |
| One Vision NGO – Environment local organization. | 1 Key informant |
| World Vision Kenya – Re-greening Africa project | 1 Key informant |
| Department of Agriculture – Nyatike Sub County | 1 key informant |
| Community forest association groups (CFA) - FGDs | 21 members |
| Okayo Planning Area Development Committee | 7 members |

Based on the sample size of 396 households, table 3.2 provides the seven wards in Nyatike sub county and the sample size per ward to guide the study.

**Table 3.2: Distribution of sample in the seven wards**

| Ward | Total No. of Households | Sample size |
|---|---|---|
| North Kadem | 6506 | 64 |
| Got Kachola | 6270 | 62 |
| Kachieng | 6160 | 60 |
| Kaler | 5750 | 56 |
| Macalder | 5560 | 55 |
| Kanyasa | 5255 | 52 |
| Muhuru | 4756 | 47 |
| **Total** | **40257** | **396** |

### 3.5 Research Instruments

This section reviews the data collection instruments (the various kinds of questionnaires used to collect the data). It will also address how the study was piloted, the section also looks at how reliability and validity of the instruments were tested. In this investigation, three instruments were used for data collection; a questionnaire for quantitative data

collection, which were administered to the community respondents at household level, an interview guide was employed to facilitate interviews with the key informants and focus group discussion guide facilitated the discussion sessions. The last two instrument were used for qualitative data collection.

The instruments are described below;

### 3.5.1 Household Questionnaire

A questionnaire refers to question set which a respondent is required to respond (Mugenda, 1999). The household questionnaire was structured in line with the four objectives of this research. The questionnaire comprised of six main sections. First section entailed the socio demographic data and the variables of interest included; age, marital status, occupation, members of household, level of education. Section two to four contained questions assessing the influence of income sources, local people's attitude, community capacity and networks and collaborations. Section five and six addressed the dependent and moderating variables respectively. The researcher utilized both open-ended and close- ended questions to gather data. A five Likert-scales was used in presentation of closed-ended queries so as to allow respondents some degree of agreement or disagreement.

### 3.5.2 Interview Guide for Key Informants

Interview is a process where a respondent is subjected to a set of verbal questions as the researcher listens and takes notes. An interview guide was developed and used for qualitative data collection for forestry opinion shapers including leaders in community forest groups, government officers and other development actors in afforestation within Nyatike sub-county. The guide comprised questions on the socio-economic indicators that impact sustainability of rural community-based afforestation projects.

### 3.5.3 Pilot Testing

Data collection instruments were pre-tested in a pilot study to identify ambiguous and difficult questions that warrant review. Ten percent of the study sample was engaged in this exercise, recruited from a randomly selected village in Nyatike, this village did not form part of the actual data collection site. The participants were thereafter not part of the sample size. Information obtained from the piloting was used to review the instrument for conformity to reliability and validity threshold.

### 3.5.4 Validity of Research Instruments

Mugenda (2003) refers to validity as the precision and appropriateness of inferences, that are premised on the investigation outcome. This relates to whether the study instrument provides true measures to which it is intended or how candid the research outcomes are. The research instruments' validity in this investigation was tested through expert opinion. The research instrument was exposed to the lecturer who reviewed the document and provided guidance on what should be changed. The research was also compared to other similar published scholarly articles. The supervisor to ascertained the likelihood of defects, weaknesses and uncertainties in any of the question. Adequate corrections and revisions were undertaken based on the reviews to enhance validity of the instrument.

### 3.5.5 Reliability of Research Instruments

Reliability entails assessment of the reliability of study findings the researcher professionally made in reference to judgements about the 'soundness' of the inquiry as regards the application and suitability of the methodology adopted and the integrity of the eventual conclusions (Helen and Joanna, 2015). In order to ensure reliability, first, possible exterior variation cause like boredom, fatigue and exhaustion were minimized by setting up of comfortable environments preceding the research, both to the interviewer and the interviewee while collecting data. Second, internal consistency was calculated from pilot study data by split half method to obtain the correlation coefficient (r). A coefficient greater than 0.7 was considered.

## 3.6 Procedure for Data Collection

First, approval to conduct the research project was requested from the National Commission for Science, Technology and Innovation (NACOSTI) besides University of Nairobi (UoN). Research assistants were hired and educated to assist with the data collection. An inception meeting was conducted to introduce the study to the relevant offices. Questionnaires were administered. The data collection instruments were pre-tested in a pilot study at a randomly selected village in Nyatike involving 10% of the sample population. Ambiguous and difficult questions identified during this process were reviewed.

Scheduling was done with the key informants and the focus group discussion participants at their convenience while also ensuring Covid 19 guidelines followed. Eligible participants at households were taken through the informed consent process and those

who consented took part in the survey. They were taken through the questionnaire administered either in English or Luo (local language). Informed consent was also sought prior to the Key informant interviews and focus group discussions.

### 3.7 Data Analysis and Presentation

This section looks at how the data was analyzed section is split into two sections; qualitative and quantitative data analysis and statistical data analysis and presentation.

#### 3.7.1 Quantitative and Qualitative Data Analysis

Quantitative data collected using the questionnaires were examined for completeness, coded, entered and analyzed using SPSS version 23. First, the questionnaire was converted into a google sheet form to facilitate the data entry process. Once a filled form was submitted, the entries were automatically saved into a google spread sheet and imported to SPSS for analysis. Both descriptive and inferential statistics were applied. Qualitative data gathered from the interviews with key informants and focus group discussions transcribed and coded into themes that align with the study objectives. Thematic analysis was conducted and results presented as verbatim alongside the quantitative results.

#### 3.7.2 Statistical Data Analysis and presentation

The quantitative data was examined using descriptive statistics, tables, means and charts to summarize the results. While for inferential statistics, the association between the outcome variable (sustainability of CBA initiatives) and the independent variables was investigated using chi-squared test at $\alpha = 0.05$ (95% confidence interval). All independent variables that showed statistical significance at bivariate analysis were instituted into an ordinary least square regression model to examine the level of interconnection between the parameters.

### 3.8 Ethical Considerations

Ethical standards were considered in the planning and carrying out of this research. First, the researcher sought scientific approval of the study from NACOSTI and UoN. Administrative clearances were sought at the respective data collection units. Second, the research was carried out with the assent of the subjects, having been notified on the study objective and their free willingness to get involved. Thus, the principle of autonomy and voluntariness was observed, and no respondent was pushed to participate in the research. Any participant was free to pull out at any point of the research with no penalty.

The right to confidentiality and privacy of the subjects was observed by ensuring that interviews are conducted in privacy. Use of personal identities such as names and was avoided. Instead, study subjects were assigned unique numbers for use during the data collection process. No names or any personal identifiers related to the information that the interviewees provide was used in the final study report. Data security was ensured through safe storage of the filled questionnaires under key and lock in order to control access to them by unauthorized individuals. Soft copy data and information has been guarded by password for the computer and any storage gadgets that shall be used.

### 3.9 Operational Definition of Variables

The choice of parameters for this inquiry were operationalized and determined as shown below in Table 3.2. The operational definition of parameters is a graphic context adopted in this research to unveil the hierarchical association between parameters, criterion and computation whilst revealing the measurement scales, techniques for collecting data and proposed analysis technique. The framework depicts how the suggested research objectives were to be attained.

**Table 3.3: Variable Definition**

| Objective | Variable | Indicators | Measurement scale | Research approach | Data collection method | Data analysis technique |
|---|---|---|---|---|---|---|
| To determine how income sources influence sustainability of community based afforestation projects in Nyatike Sub County, Migori County, Kenya. | Income sources | - Number of respondents reporting owning afforestation related business in the community<br>- Income opportunities as a result of afforestation enterprises<br>-View of respondents regarding opportunities for new businesses<br>-Community rating of entrepreneurial skills among its members | Nominal ratio | Mixed approach | Questionnaire, KII, FGD | Description (mean, mode, median), Correlation &Cross Tabulation |
| To determine the extent to which local people attitudes influence the sustainability of community based afforestation initiatives in Nyatike Sub County, Migori County, Kenya | Local people's attitude | -Number of respondents with comprehension on afforestation<br>-Number of sources of knowledge on afforestation<br>-Number of people by gender recognizing value of afforestation<br>-Number demonstrating engagement and motivation on community afforestation initiatives<br>- Barriers to afforestation uptake | Ordinal ratio | Mixed approach | Questionnaire, KII, FGD | Description (mean, mode, median), Correlation &Cross Tabulation |
| To establish how community capacity influence the sustainability of community based afforestation initiatives in Nyatike Sub County, Migori County, Kenya | Community capacity | -Ranking of local leadership assistance by the interviewee<br>-Number of respondents with knowledge of community afforestation resources<br>-Respondent's opinion on resource capacity<br>-Respondents opinion on joint efforts between government and community in afforestation projects | Nominal ratio | Mixed approach | Questionnaire, KII, FGD | Description (mean, mode, median), Correlation &Cross Tabulation |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | - Respondents participation in afforestation projects | | | | |
| To assess the level at which networks and collaboration influence sustainability of community based afforestation initiatives in Nyatike Sub County, Migori County, Kenya. | Networks and collaboration | -Respondent informed on range of existing forest partners.<br>-Respondent view on role of partnerships in afforestation<br>-Respondent rating of the influence of the existing partnerships and collaborations | Ordinal ratio | Mixed approach | Questionnaire, KII, FGD | Description (mean, mode, median), Correlation &Cross Tabulation |
| | Sustainability of community based afforestation initiatives | -Opinion on status of tree cover<br>- Community attitude towards afforestation<br>-Number of respondents indicating having knowledge of the CBA project sustainability plan<br>-Number of respondent participating in the current CBAs<br>-Number of respondents reporting variety of active environment enterprises in the community<br>-Respondent rating on established structures/partnerships capacity to maintain CBA projects outcomes<br>-Number of community driven projects developed or replicated after external support. | Nominal ratio | Mixed approach | Questionnaire, KII, FGD | Description (mean, mode, median), Correlation &Cross Tabulation |
| | Government policies and regulation | -Knowledge on existing policies and guidelines on afforestation<br>-Rating performance of the policies and guidelines | Nominal ratio | Mixed approach | Questionnaire, KII, FGD | Description (mean, mode, median), Correlation &Cross Tabulation |

# CHAPTER FOUR

# DATA ANALYSIS, RESULTS AND INTERPRETATION

## 4.1 Introduction

The main emphasis for this chapter is data scrutiny and interpreting findings thereof based on the aim of the inquiry. The analysis is based on the main themes anchoring the study, these themes include (Income Sources and Sustainability of Community Based Afforestation Projects, Local People's Attitude and Sustainability of Community-based Afforestation Projects, Community Capacity and Sustainability of Community-based Afforestation Projects, Network and Collaboration and Sustainability of Community-based Afforestation Projects).

## 4.2 Questionnaire Return Rate

The research selected a sample size comprising of 396 respondents out of a total population of 40,257 households of Nyatike Sub County. However, the study managed to collect data from 388 respondents, this represent 98% return rate. This return rate is relatively high as compared to the proposed standard of 70%. Saunders and Thornhill (2016) proposed that a 70% return rate is sufficient for drawing conclusions. The study achieved a 98% response rate that is relatively high as compared to the proposed standard of 70%. The high response rate was inspired by the fact that most of the respondents believed that the outcome of the inquiry will be useful to the community.

## 4.3 Data Reliability

The authenticity of the data collection tool was tested using the Cronbach's alpha in SPSS, the statistic is provided on a scale running from 0-1, with 1 indicating perfect internal consistency while zero indicating lack of internal consistency. A score of more than 0.7 is considered good enough for analysis. The analysis indicates that the study scored 0.8 which means that the data set was reliable.

**Table 4.1: Overall Cronbach's Alpha**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.800 | 0.801 | 6 |

The table 4.1 shows the overall Cronbach's Alpha.

**Table 4.2: Individual Cronbach's Alpha for variables**

| | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|
| Sustainability | 0.643 | 0.493 | 0.751 |
| Income | 0.695 | 0.824 | 0.735 |
| Attitude | 0.166 | 0.094 | 0.855 |
| Capacity | 0.703 | 0.534 | 0.732 |
| Network | 0.491 | 0.312 | 0.784 |
| Government Policies | 0.703 | 0.829 | 0.732 |

The Cronbach's Alpha for individual variables (Sustainability, income, attitude, capacity, network and Government Policies) are 0.75, 0.735, 0.855, 0.732, 0.784 and 0.732 respectively. Therefore, the researcher proceeded with the analysis given that the data set had been confirmed to be reliable. This is above the 0.7 threshold which is an indication that the variables are internally consistent.

### 4.4 Demographic Characteristics of the Respondents

This part deals with the analysis of the demographic features of the interviewees, the first part describes the gender, marital status and education status of the interviewees while the second part describes the income footing of the respondents.

#### 4.4.1 Distribution of Respondents by Gender

The gender of the respondent is an important variable in social studies, this distribution helps in determining the extent of involvement in sustainability projects by gender, table 4.3 exhibits the results of the distribution by gender.

**Table 4.3: Distribution of Respondents by Gender**

| # | Characteristic | Group | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Female | Gender | 209 | 54% |
| 2 | Male | Gender | 179 | 46% |

Table 4.3 shows that 54% of the interviewees were female while 46% of the interviewees were male. This is attributable to the fact the research was conducted during the day when most men were already at work. In terms of marital status 70% were married and living as married, 16% are widowed and 14% were single and never married. This is because the research targeted the household heads which in most cases are married.

### 4.4.2 Distribution of Respondents by Marital Status

Table 4.5 shows the groupings of interviewees by marital status, which is an important demographic characteristic because it determines the level of participation in sustainability projects.

**Table 4.4: Distribution of Respondents by Marital Status**

| # | Characteristic | Group | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Married/Living as Married | Marital Status | 273 | 70% |
| 2 | Widowed | Marital Status | 62 | 16% |
| 3 | Single/Never Married | Marital Status | 53 | 14% |

### 4.4.3 Distribution of Respondents by Education Status

The educational level of those interviewed is important because it determines the level of awareness on the issues around afforestation also shapes the attitude towards sustainability projects. Table 4.5 provides the distribution of interviewees by Level of education.

**Table 4.5: Distribution of Respondents by Marital Status**

| # | Characteristic | Group | Frequency | Percentage |
|---|---|---|---|---|
| 1 | None | Status Education | 22 | 6% |
| 2 | Primary | Status Education | 220 | 57% |
| 3 | Secondary | Status Education | 103 | 27% |
| 4 | Tertiary | Status Education | 43 | 11% |

In terms of the education status 57% of the respondents had primary school as the highest education, 27% stipulated that their highest education level was secondary school, while 11% indicated tertiary, 6% of the respondents did not indicate their level of education. A large majority of the residents of rural areas may not have formal education beyond high school. People with higher educational level usually migrate to town to look for formal employment as compared to the rural residents who engage in casual labor and self-employment at the village.

### 4.4.4 Distribution of Respondents by Level of Income

The distribution of interviewees by level of income is important because one of the goals of the research is to establish the impact of income on sustainability projects.

**Table 4.6: Distribution of Respondents by level of Income**

| # | Characteristic | Group | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Casual Labor | Employment status | 78 | 20% |
| 2 | Formal Employment | Employment status | 26 | 7% |
| 3 | Self employed | Employment status | 284 | 73% |
| 4 | < 5,000 | Level of Income | 218 | 56% |
| 5 | 5,000 - 10,000 | Level of Income | 87 | 22% |
| 6 | 10,000 - 15,000 | Level of Income | 55 | 14% |
| 7 | 15,000 - 20,000 | Level of Income | 15 | 4% |
| 8 | > 20,000 | Level of Income | 13 | 3% |
| 9 | Agriculture | Source of Income | 207 | 53% |
| 10 | Business | Source of Income | 112 | 29% |
| 11 | Casual Labor | Source of Income | 23 | 6% |
| 12 | Others | Source of Income | 22 | 6% |
| 13 | Salary | Source of Income | 23 | 6% |

Table 4.6 exhibits the employment status, level of earnings and the sources of income of those interviewed. The table indicates that 20% of the responder were casuals, 7% were in formal employment and 73% were in formal employment. 53% earned their source of income from agriculture, 29% from businesses, 6% from casual labor, 6% from salary while these who earned from other sources were 6%. In terms of the level of income 56% earned less than 5000, 22% earned between 5,000 - 10, 000, 14% had earnings of between 10,000 - 15, 000, 4% earned 15,000 - 20,000 and 3% earned above 20,000. These results are consistent with the general socio-economic condition in the rural areas. The rural parts are generally reliant on agriculture and the earning capacity is relatively lower than the urban areas.

### 4.5 Sustainability of Community Based Afforestation (CBA) Projects

Sustainability is the ability to benefit from the natural resources now without compromising the potential of upcoming generation to benefit from the same resources. It's about objective utilization of the natural resources in this case forest/trees while thinking about the feature supply. This section therefore discusses the concepts of sustainability. This section looks at the community rating of entrepreneurial skills among its members, Number of respondents reporting owning/participating in afforestation related businesses in the community, - Income opportunities as a result of afforestation enterprises and view of respondents regarding opportunities for new businesses.

### 4.5.1 Independent Community Afforestation Projects in Nyatike

The issue of independent community sustainability is an imperative issue because it provides an assessment on the extent to which the community cares about its environment without the involvement of external actors. In this case the respondents were asked if the community was able to continue supporting afforestation without external support.

**Table 4.7: The Status of Independent Community Afforestation Projects in Nyatike**

| # | Independent Community Afforestation | Frequency | Percentage |
|---|---|---|---|
| 1 | Yes | 279 | 72% |
| 2 | No | 109 | 28% |
| **3** | **Total** | **388** | **100%** |

Table 4.7 indicates that 72% of the respondents (279) agree that their community can continue supporting/participating in the afforestation projects without the external support. Only 28% disagree that their community can independently support the afforestation projects. This implies that the community has a high propensity to support sustainability projects within their area. The Mirema CFA FDG comments affirm these results; Her verbatim responses are given below

*"Even without external support, our community would continue to support afforestation because they have received a lot of information on forestry and its importance" (Nyatike Mirema CFA)*

### 4.5.2 Personal Drive to Support Sustainable CBA Projects Within the Farm Land

This section investigates the personal drive of the respondents to participate in sustainable CBA projects. The respondents were asked whether they support afforestation activities within their farmland without external push/pressure and support. The researcher sought to understand whether the respondents if left on their own can continue with sustainable afforestation projects in their farmland.

**Table 4.8: Personal Drive to Support Sustainable CBA Projects Within the Farm Land**

| # | Personal Drive to Support sustainable CBA | Frequency | Percentage |
|---|---|---|---|
| 1 | Yes | 366 | 94% |
| 2 | No | 22 | 6% |
| **3** | **Total** | **388** | |

The results indicate that 945 of the respondents have a personal drive to support sustainable CBA projects/initiatives within their farm land without external support. Only 6% indicated that they do not have sustainable afforestation initiatives in their farm land. These results indicate that there is a personal drive within the residents to participate in the afforestation projects. It also shows that the residents are aware of the benefits of afforestation, they have an inward motivation to support sustainability projects in their farm land. This is probable of expanding afforestation level in the sub county. The environment group in charge of OKAYO PADC observed that personal drive leads to continuation of sustainability projects even after the donors leave.

*"When afforestation projects transition, communities continue with environmental activities, example is the OKAYO PADC which was previously funded by IGAD." (Environment group)*

### 4.5.3 Sustainability of Community Based Afforestation (CBA) projects

This section covers the description of the responders' attitude towards the thematic questions on sustainability, people attitude towards afforestation, government policies on sustainable projects. The impact of income on participating in sustainable projects, the impact of community capacity on the implementation of sustainable projects and finally the impact of networks on the sustainability of CBA projects. The respondents were subjected to Linkert scale questions where they expressed their opinion on whether they agreed or disagreed with statements. The scale was set as follows strongly agree=5, agree=4, neutral=3, disagree=2, strongly disagree=1.This data was collected and averaged in order to make inferences from it. The following interpretations are attached to the mean score obtained in each question; A mean score of1-1.9 for strongly disagree, 2- 2.9 disagree, 3-3.9 neutral ,4-4.9 agree and 5 for strongly agree

**Table 4.9: Sustainability of Community Based Afforestation (CBA) projects**

| Sustainability of Community Based Afforestation (CBA) projects | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | Inference |
|---|---|---|---|---|---|---|---|
| Over 10 % of forest and farm lands in Nyatike is forested/ on trees | 9% | 16% | 22% | 38% | 14% | 3.31 | Neutral |
| My Community generally like participating in tree planting/growing | 3% | 14% | 8% | 52% | 23% | 3.78 | Agree |
| There are active community groups promoting afforestation in Nyatike | 13% | 24% | 12% | 37% | 14% | 3.14 | Neutral |
| There is increase in afforestation related income opportunities over the last 5 years | 5% | 13% | 22% | 47% | 13% | 3.50 | Agree |
| More partners are supporting afforestation activities in my community with increased resource allocations | 14% | 28% | 17% | 31% | 10% | 2.95 | Disagree |
| In your opinion have community activities negatively impacted on forest/tree cover | 2% | 11% | 6% | 48% | 32% | 3.98 | Agree |

The outcomes reveal that a majority (52%) of the respondents agree that over 10 % of forest and farm lands in Nyatike is forested/ on trees. 22% are neutral while 25% disagree. An overwhelming 75% of the respondents agree that their community generally like participating in tree planting/growing, 8% are indifferent while 17% does not agree. The outcome also indicates that 51% of the respondents agree that there are active community groups promoting afforestation in Nyatike, 12% are neutral while 37% does not agree. Consequently, the out-turn indicate that 60% of the responders agree that there is increase in afforestation related income opportunities over the last 5 years. However only 41% of the respondents agree that there has been an increase in partner support and resource allocation, 42% of the respondents disagree while 17% are neutral. Finally, 80% of the respondents agree that community activities have impacted negatively on afforestation,6% are neutral while 13% does not agree.

### 4.6 Income and Sustainability of CBA Projects

The income earned by an individual can influence whether or not he participates in sustainability projects. High income earners are usually inclined to participate in afforestation projects. This section deals with the concepts of income and how they affect the sustainability of CBA projects.

#### 4.6.1 Income Sources through Undertaking Afforestation Initiatives in the Community

This section investigates the extent to which the respondents earn income through afforestation initiatives. The respondents were asked the key income sources exist through undertaking afforestation initiatives in their community.

**Table 4.10: Income Sources Through Undertaking Afforestation Initiatives in the Community.**

| | | Frequency | | Percentage | |
|---|---|---|---|---|---|
| # | Income Sources | Yes | No | Yes | No |
| 1 | Charcoal Selling | 330 | 58 | 85% | 15% |
| 2 | Sale of Fruits | 197 | 190 | 51% | 49% |
| 3 | Sale Fuel Wood | 269 | 119 | 69% | 31% |
| 4 | Bee Keeping | 33 | 355 | 9% | 91% |
| 5 | Sale of Medicinal Herbs | 61 | 327 | 16% | 84% |
| 6 | Sale of Tree seedlings | 127 | 261 | 33% | 67% |

The results indicate that 85% of the respondents have benefited from the sale of charlcoal,51% have sold fruits to earn an income,69% have engaged in selling fuel wood, while only 9% engage in bee keeping. Additionally, 16% of the respondents have benefited from the sale of medicinal herbs and 33% are engaged in sale of tree seedling. These outcomes proved that a majority of the responders rely on afforestation projects as a source of income. Afforestation therefore provides a platform for earnings a leaving and it is in their interest to conserve the environment to continue earning a living.

These results are consistent with the qualitative responses from the Mirema Community Forest Association response

"*Afforestation projects are source of income through sale from fruits, timber, sale of wood fuel/Charcoal – Female environment champion" (CFA Response)*

### 4.6.2 Participation in Afforestation Business Activities

This section deals with the extent to which the respondent derives income from afforestation or participates in afforestation related business opportunities such as charcoal selling, sale of fruits, sale of firewood, bee keeping, sale of medicinal herbs and sale of seedlings.

**Table 4.11: Participation in Afforestation Business Activities**

| # | Participation in Afforestation Business Activities | Frequency | Percentage |
|---|---|---|---|
| 1 | Yes | 253 | 65% |
| 2 | No | 135 | 35% |
| **3** | **Total** | **388** | **100%** |

The results indicate that 65% of the respondents have participated in afforestation business activities hence derive income from afforestation, while 35% of the respondents have not. This out-turn imply that a large number of the responders rely on afforestation business activities as a key driver in participating in afforestation and hence their involvement in enhancing sustainability of CBA projects.

### 4.6.3 Level of Involvement in Afforestation Related Business

This section looks at the extent to which men and women participate in afforestation related business. Responders were requested to express their view on which gender is mostly involved in afforestation related business.

**Table 4.12: Level of Involvement in Afforestation Related Business**

| # | Level of Involvement in Afforestation Related Business | Frequency | Percentage |
|---|---|---|---|
| 1 | Men | 308 | 79% |
| 2 | Women | 80 | 21% |
| **3** | **Total** | **388** | **100%** |

The results proved that most of the responders agree that men are more involved in afforestation business as compared to women, 79% of the respondents agreed while 21% disagreed.

These results were confirmed by the responses from the CFA

*"Men are mostly involved in afforestation businesses since Luo capture man as more energetic and they can access capital more easily." (CFA Response)*

### 4.6.4 Influence of Income on Sustainability of CBA Projects.

Table 4.13 depicts the degree to which income of the respondents affects their participation in sustainability projects. The Likert scale questions are coded from strongly agree to disagree, the interpretations of the results are based on the means. The following interpretations are attached to the mean and mode; A mean score of1-1.9 for strongly disagree, 2- 2.9 disagree, 3-3.9 neutral, 4-4.9 agree and 5 for strongly agree

**Table 4.13: Influence of Income Sources on Sustainability of CBA Projects**

| Influence of income sources on sustainability of CBA projects | Disagree | Neutral | Agree | Strongly Agree | Mean | Inference |
|---|---|---|---|---|---|---|
| Tree based enterprises/business are rewarding or highly profitable | 8% | 8% | 41% | 44% | 4.21 | Strongly Agree |
| Afforestation business opportunities have attracted many to participate in tree growing and or protection | 8% | 5% | 44% | 42% | 4.20 | Strongly Agree |
| I would prefer undertaking afforestation only if it brings additional income in my household | 27% | 2% | 21% | 51% | 3.95 | Agree |
| Government is supportive of afforestation business enterprises | 27% | 11% | 33% | 29% | 3.62 | Neutral |
| There are no barriers towards community groups participating in afforestation enterprises | 27% | 11% | 25% | 36% | 3.69 | Agree |

*Combined mean=3.934, standard deviation =0.276*

On average 85% of the respondents agree that afforestation enterprises or businesses are highly profitable, additionally 86% of the respondents agree that afforestation business have attracted many people to participate in sustainability of the projects. The research additionally reveals that 72% of the respondents agree that they can do afforestation as additional source of income.62% the respondents agree that the government is supportive of afforestation business,11% are neutral while 27% think that the government is unsupportive of afforestation business. The table also shows that 61% of those interviewed agree that there are no barriers towards community groups participating in afforestation enterprises, while 27% believe that there exist a barrier and 11% are neutral.

### 4.7 Influence of Local People's Attitude on Sustainability of CBA Projects

This section looks at how the local people's attitude affect the sustainability projects within their locality. Specifically, this section will assess the level of knowledge in afforestation, sources of knowledge on afforestation, Assessment on the attitude towards the value of afforestation, level of motivation towards afforestation projects and barriers towards afforestation uptake.

#### 4.7.1 Knowledge in Afforestation

This part looks at the extent to which the respondents are aware of the afforestation activities within their locality and the media though which thy learnt about afforestation.

**Table 4.14: Knowledge in Afforestation**

| | | Frequency | | Percentage | |
|---|---|---|---|---|---|
| # | | Yes | No | Yes | No |
| 1 | Knowledge in Afforestation | 165 | 223 | 43% | 57% |
| 2 | Formal Education | 137 | 251 | 35% | 65% |
| 3 | Awareness Meeting | 64 | 324 | 16% | 84% |
| 4 | Training by Extension Officers | 154 | 234 | 40% | 60% |
| 5 | Indigenous knowledge | 182 | 206 | 47% | 53% |
| 6 | Media | 23 | 365 | 6% | 94% |
| 7 | Other | 5 | 383 | 1% | 99% |

Table 4.14 shows that only 43% have knowledge in afforestation, 57% does not have. This means that there is little awareness campaign done on afforestation. The participation in afforestation project is therefore left to chance. The study therefore recommends that there should be an awareness campaign to enhance participation in sustainability projects. The results also indicate that 35% of the respondents have learnt it from formal education, 16% from awareness meetings, 40% from training by extension officers, 47% form indigenous knowledge,65 from media sources and 1% from other means. These results imply that there is still some work which needs to be done by the government to increase awareness thorough the extension officers and mainstream media.

#### 4.7.2 General Attitude on Sustainability of CBA projects

This section analyzes the general attitude of the respondent on sustainability projects, questions were asked to ascertain the attitude towards sustainability projects in Nyatike. The following themes were assessed (Community involvement in afforestation activities, attitude

the threat posed by deforestation activities, Attitude towards unsustainable charcoal burning in the community and attitude towards participation in community afforestation projects)

**Table 4.15: General Attitude on Sustainability**

| | | Frequency | | Percentage | |
|---|---|---|---|---|---|
| **#** | **Description** | **Yes** | **No** | **Yes** | **No** |
| 1 | In your opinion, are the community members of Nyatike actively involved in afforestation activities? | 258 | 130 | 67% | 33% |
| 2 | Do you feel human deforestation activities are causing harm to the environment and threat to lives and livelihoods | 377 | 10 | 97% | 3% |
| 3 | Are you concerned with unsustainable charcoal burning in your community | 329 | 58 | 85% | 15% |
| 4 | Have you ever participated in community afforestation projects | 211 | 176 | 55% | 45% |

The results indicate that 67% of the responders agree that community dwellers are actively occupied in afforestation activities. However, 97% of the respondents feel human deforestation activities are causing harm to the habitat and threat to lives and livelihoods. Additionally, 85% of the respondents are concerned with unsustainable charcoal burning in your community. Despite these concerns only 55% of the respondents have participated in community afforestation projects. These results imply that there is a positive attitude towards afforestation, however only a small number have participated on the sustainability projects. There is therefore a need to scale up community driven afforestation programs which will increase community participation and enhance sustainability of the projects.

These results are consistent with the responses of the Agriculture Officer on the thematic area the CFA avers as follows

*"Nyatike people now take environmental activities and tree planting positively because they are now experiencing change in weather patterns e.g. receiving rainfall in two seasons" (Agriculture Officer)*

*"Poverty and availability of trees drives people to participate in afforestation" ( Nyatike Mirema CFA)*

### 4.7.3 Influence of Local People's Attitude on Sustainability of CBA Projects

Table 4.16 reveals the degree to which peoples attitude affects the sustainability of community-based afforestation initiatives the findings are presented in form of means and mode, which represent the average belief of all the respondents questioned during the survey through the Likert scale responses. The following interpretations are attached to the mean and mode; A mean score of 1-1.9 for strongly disagree, 2- 2.9 disagree,3-3.9 neutral ,4-4.9 agree and 5 for strongly agree.

**Table 4.16: Influence of Local people's Attitude on Sustainability of CBA Projects**

| Influence of Local people's attitude on sustainability of CBA projects | Strongly Disagree | Disagree | Neutral | Agree | Mean | Inference |
|---|---|---|---|---|---|---|
| Limited knowledge on benefits of trees leads to low community participation in afforestation | 1% | 40% | 2% | 57% | 3.2 | Neutral |
| Afforestation is very key to our survival | 0% | 34% | 1% | 64% | 3.3 | Agree |
| There are many challenges to uptake of afforestation projects in my community | 1% | 52% | 3% | 44% | 2.9 | Disagree |
| Community afforestation groups are critical in success of tree planting and forest conservation & protection in my community | 1% | 54% | 9% | 36% | 2.8 | Disagree |
| Men are most involved in afforestation compared to women | 2% | 34% | 6% | 58% | 3.2 | Neutral |

*Combined mean=3.08, standard deviation = 0.216*

The results indicate 40% of the respondents disagree that Limited knowledge on benefits of trees leads to low community participation in afforestation. However, 57% of the respondents agree that limited knowledge is to blame for low community participation. The mean response grade is 3.2 which means that a significant number (more than 50%) agree that lack of knowledge is the Couse of low participation. These results support the findings of Marshall, Abdulla and Rouphael (2010) who found that knowledge of afforestation benefits affect the community attitude. Additionally, 64% of the respondents agree that afforestation

is very key to our survival, with only 34% disagreeing with this statement, the average response is 3.3, this means that afforestation is a major factor is sustainability.

A majority of the respondents disagree (52%) that there are many challenges to uptake of afforestation projects in my community, with only 44% of the respondents agreeing with this statement. The mean score is 2.9, this reveals that most of the respondents did not agree with this statement. A significant number of respondents (54%) do not think that community afforestation groups are critical in success of tree planting and forest conservation & protection in their community. Finally, the results reveal that most men are involved in afforestation compared to women; 58% agree while 34% disagree. These results contradict the findings of Kobbail (2011) who found that women possess positive more positive attitude as compare to men.

### 4.8 Influence of Community Capacity on Sustainability of CBA Projects

Community capacity is the potential of the community to engage in and support afforestation based on the available resources within their reach e.g. land, skills, water, capital, inputs etc. This section assesses the ability of the community capacity to influence sustainability projects in their locality. This section will look at the level of respondent's participation in afforestation projects, the extent to which local leadership support sustainability, respondent's knowledge of community afforestation resources, respondent's view on resource capacity, assessment of the joint efforts between government and community in afforestation projects and participation in afforestation projects

#### 4.8.1 Availability of resources which support community participation in afforestation activities

Respondents were asked if there are resources which support community participation in afforestation activities

**Table 4.17: Availability of Afforestation Resources**

| | | Frequency | | Percentage | |
|---|---|---|---|---|---|
| # | Availability of Afforestation resources | Yes | No | Yes | No |
| 1 | Are there existing resources that support community participation in afforestation activities? | 366 | 22 | 94% | 6% |

The table depicts that 94% of those interviewed agree that there are resources needed to afforestation activities. This implies that the communities have the capacity to engage in the CBA sustainable projects.

### 4.8.2 Most Beneficial Resources for Scaling Afforestation Efforts.

This section assesses the presence of necessary resources needed to scale up the afforestation efforts. The responders were requested to indicate the type of the resource that was most beneficial in scaling up afforestation efforts.

**Table 4.18: Resources Needed to Scale Afforestation Efforts**

| | | Frequency | | Percentage | |
|---|---|---|---|---|---|
| # | Resources | Yes | No | Yes | No |
| 1 | Access to Land | 345 | 43 | 89% | 11% |
| 2 | Availability of Water | 271 | 117 | 70% | 30% |
| 3 | Extension services (Government and other partners) | 37 | 351 | 10% | 90% |
| 4 | Access to Input (seeds, tools, seedling tubes.) | 134 | 254 | 35% | 65% |
| 5 | Indigenous knowledge | 148 | 240 | 38% | 62% |
| 6 | Environmental groups/CFAs | 85 | 303 | 22% | 78% |
| 7 | Human Resource/man power | 108 | 280 | 28% | 72% |
| 8 | Regulations and policies supporting forestry | 38 | 350 | 10% | 90% |

The results indicate that 89% of respondent agree that access to land is beneficial in scaling up afforestation efforts,70% agree that a availability of water is crucial, while only 10% think that extension services from government and other partners is important.35% of the respondents think that access to inputs (seeds and tools) is important. Additionally, 38% think that indigenous knowledge is important, while 22% think that environmental groups play a key role in afforestion,28% view manpower as a contributing factor while onlynb10% believe that regulations and policies can support afforestation. These results imply that most of the respondents believe that the community has the capacity to participate in sustainability projects independently without the support of the government, external partners or policies These results are consistent with the assessment of the CFA, responses reported verbatim

*"Water, Land, manpower, government policies and regulations are key existing community resources that enable Nyatike people take part in afforestation while unreliable rainfall poses major threat to afforestation." (CFA response)*

### 4.8.3 Influence of Community Capacity on sustainability of CBA projects

This section deals with the assessment of the community capacity on the successful implementation of sustainability projects. The following concepts of capacity are assessed; skills and knowledge to support afforestation, access to services and inputs required for afforestation, government support to undertake afforestation activities, support from laws and regulations and the capacity of community environment groups to implement sustainability projects. The findings are presented in form of means and mode, which represent the average belief of all the respondents questioned during the survey through the Likert scale responses. The following interpretations are attached to the mean and mode; A mean score of 1-1.9 for strongly disagree, 2- 2.9 disagree,3-3.9 neutral ,4-4.9 agree and 5 for strongly agree.

**Table 4.19: Influence of Community Capacity on sustainability of CBA projects**

| Influence of Community Capacity on Sustainability of CBA Projects | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | Inference |
|---|---|---|---|---|---|---|---|
| I have required skills and knowledge to support afforestation | 3% | 13% | 2% | 48% | 33% | 3.94 | Agree |
| I can easily access services and inputs required for afforestation as per need | 13% | 24% | 9% | 35% | 19% | 3.22 | Neutral |
| The government highly supports my community to undertake afforestation activities | 7% | 23% | 14% | 32% | 24% | 3.42 | Neutral |
| The laws and regulations provided by government or made by community support afforestation projects | 1% | 5% | 9% | 52% | 33% | 4.10 | Agree |
| Majority of people in Nyatike are members of community environment groups | 11% | 29% | 16% | 34% | 11% | 3.04 | Neutral |

*Combined mean= 3.544, standard deviation = 0.458*

The results indicate that 81% of the respondents agree that they possess the needed skills and knowledge to support afforestation, on the other hand 54% of the responders concur that they can easily access inputs required for afforestation, however 37% postulates that they do not have access to inputs, 9% are neutral. On average a majority of the responders concur that they have access to inputs. The results indicate that 56% of the respondents agree that the government highly supports their community to undertake afforestation activities, 14% are indifferent while 30% disagrees that the government supports their afforestation initiatives.

On average the respondents agree that there is sufficient government support for the afforestation initiatives. 85% of the respondents agree that the laws and regulations provided by government support afforestation projects. Only 4% of the respondents disagree while 9% are indifferent. In terms of community involvement 44% of the respondents agree that the community is involved in afforestation, 16% are indifferent while 40% of the respondents disagree that the community is involved.

### 4.9 Influence of Networks and Collaborations on Sustainability of CBA Projects

This section investigates the level at which networks and collaboration influence sustainability of community-based afforestation initiatives in Nyatike Sub County, Migori County, Kenya. The following thematic areas have been discussed in details below; Information about the existence of forest partners, assessment of the role of partnerships in afforestation and the respondents rating of the influence of the existing partnerships and collaborations on sustainability of CBA initiatives.

#### 4.9.1 Availability of Afforestation Partners

This section investigates the availability of partners who can be useful in financing and supporting the afforestation projects. The respondents were asked if there are partners within their community supporting/involved in afforestation projects in their community.

**Table 4.20: Availability of Afforestation Partners**

| # | Availability of Afforestation Partners | Frequency | | Percentage | |
|---|---|---|---|---|---|
| | | Yes | No | Yes | No |
| 1 | Are there partners within your community supporting/involved in afforestation projects? | 212 | 176 | 55% | 45% |

The results indicate that 55% of the respondents agree that there are partners who engaged in supporting afforestation projects. These results are consistent with observations of the female environment champion who reported that;

*"Through partnerships my community have received seedlings, trainings on proper tree planting "(Female Environment champion).*

#### 4.9.2 Types of Afforestation Partners

This section assesses the various types of partners available in the community, respondents were asked to identify the partners involved in scaling community afforestation efforts.

**Table 4.21: Types of Afforestation Partners**

| # | Types of Afforestation Partners | Frequency | | Percentage | |
|---|---|---|---|---|---|
| | | Yes | No | Yes | No |
| 1 | Government | 63 | 325 | 16% | 84% |
| 2 | CSO/NGOs | 96 | 292 | 25% | 75% |
| 3 | Individual Environment champions | 36 | 352 | 9% | 91% |
| 4 | Private sector players | 30 | 358 | 8% | 92% |
| 5 | Churches/Faith based institutions | 17 | 371 | 4% | 96% |
| 6 | Community Environmental groups/CFAs | 77 | 311 | 20% | 80% |
| 7 | Media | 12 | 376 | 3% | 97% |

The results indicate that only 16% of the respondents think that the government is involved in supporting afforestation projects, 25% know of NGOs and CSOs involved in afforestation services. The results also indicate that only 9% could identify individual environmental champions, while private sector players were identified by only 8%.4% of the respondents think that faith based organizations play a role in sustainability projects, while 20% think that community environmental groups pay a critical role and only 3% recognized the media as partners in the afforestation projects. These results imply that there is still a great opportunity for external players to partner with local communities in the sustainability projects. The government and the private sector have better opportunities to collaborate with local residents to enhance the success of sustainability projects.

These findings are consistent with the CFA responses (see verbatim report below)

*"Partnerships are very important e.g British American Tobacco (BAT) has supply tree seedlings to schools, they also make many people to join in tree planting." (CFA, Response)*

### 4.9.3 Influence of Community Networks and Collaborations on sustainability of CBA Projects.

This section investigates the impact of networks and collaboration influence sustainability of community based afforestation (CBA) projects in Nyatike, Migori County, Kenya. The following concepts of networks and collaborations are assessed in this section; role of partnership in scaling afforestation initiative, presence of strong networks and collaborations that can champion afforestation, Amount of resources for afforestation linked to strong networks and collaborations and the level of partnership between the community and external partners in implementing sustainability projects.

**Table 4.22: Influence of Networks and Collaborations on Sustainability of CBA Projects**

| Influence of Community Capacity on sustainability of CBA Projects. | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | Inference |
|---|---|---|---|---|---|---|---|
| Strong partnerships play a key role scaling afforestation initiative | 1% | 2% | 10% | 43% | 44% | 4.28 | Agree |
| Communities in Nyatike have established strong networks and collaborations that champion afforestation | 13% | 21% | 16% | 35% | 16% | 3.20 | Agree |
| Weak coordination and collaborations between community and partners lead to failure of afforestation | 0% | 2% | 9% | 45% | 44% | 4.31 | Strongly Agree |
| Increased resources for afforestation can be linked to strong networks and collaborations | 1% | 3% | 16% | 54% | 27% | 4.04 | Agree |
| Community prefers to work with partners for success in forestry projects | 0% | 7% | 9% | 47% | 37% | 4.13 | Agree |

*Combined mean= 3.992, standard deviation = 0.456*

The results indicate that strong partnership plays a key role in scaling afforestation initiative, with a mean score of 4.28 and 87% of the responders agreeing to this fact,10% of the respondents are neutral while 3% do not agree. However only 51% of the respondents agree that communities in Nyatike have established strong networks and collaborations that champion afforestation, 16% are neutral and 34% disagree. The respondents generally agree that weak coordination and collaborations between community and partners lead to failure of afforestation; with a mean of 4.31, 89% of the respondents agree, 9% are neutral and 2% does not agree. On the same note the respondents generally agree that Increased resources for afforestation can be linked to strong networks and collaborations (The mean score is 4.04, 81% agree, 16% are neutral while 4% does not agree). Finally, the results indicate that the community prefers to work with partners for success in forestry projects (the mea score is 4.13, 84% of the respondents agree, 9% are neutral and 7% does not agree).

## 4.10 Influence of Government Policies and Regulations on Sustainability of CBA Projects

This section assesses the level at which government policies and regulations influence sustainability of community-based afforestation initiatives in Nyatike Sub County, Migori

County, Kenya. The following thematic areas have been reviewed; The level of awareness of existing policies and guidelines on afforestation

### 4.10.1 Awareness of government policies

This part investigated the level of awareness of government's policies and regulations guiding afforestation. Responders were questioned if they were informed of any government policies which protect the communities undertaking afforestation projects

**Table 4.23: Awareness of government policies**

| # | Awareness of government policies | Frequency | | Percentage | |
|---|---|---|---|---|---|
| | | Yes | No | Yes | No |
| 1 | Awareness of government policies/guidelines/regulations which protect communities undertaking afforestation activities | 348 | 40 | 90% | 10% |

The results indicate that 90% of the respondents are aware of government policies or regulations supporting afforestation activities in the community. This implies that there are good policies which can encourage sustainability projects.

### 4.10.2 Influence of Government Policies and Regulations on Sustainability of CBA Projects

This section assesses the influence of government policies on sustainability projects, Linkert scale questions were asked to assess the various constructs of government policies on sustainability. The following concepts were assessed in this part; The presence of Government policies and guidelines on environment management, support for the government policies from the community, the influence of government policies on afforestation, the level of support given by the county government, the implementation of the policies and regulations.

The Likert scale questions are coded from strongly agree to disagree, the interpretations of the results are based on the means. The following interpretations are attached to the mean and mode; A mean score of1-1.9 for strongly disagree, 2- 2.9 disagree, 3-3.9 neutral ,4-4.9 agree and 5 for strongly agree.

**Table 4.24: Influence of Government Policies and Regulations on Sustainability of CBA Projects**

| Influence of government policies and regulations on sustainability of CBA projects | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | Inference |
|---|---|---|---|---|---|---|---|
| Government policies and guidelines on environment management are key is success of afforestation projects | 0% | 2% | 4% | 47% | 47% | 4.37 | Strongly Agree |
| My community supports enforcement/implementation of afforestation guidelines and policies | 14% | 15% | 14% | 44% | 13% | 3.27 | Neutral |
| Existence of government policies and guidelines on afforestation influenced my interest in participating in afforestation projects | 10% | 16% | 8% | 36% | 30% | 3.58 | Agree |
| The county government have adequate staff supporting implementation and enforcement of afforestation policies and guidelines | 27% | 19% | 24% | 24% | 6% | 2.65 | Disagree |
| Policies and guidelines around afforestation are effectively implemented in community | 14% | 23% | 12% | 38% | 14% | 3.13 | |

*Combined mean 3.4, standard deviation =0.6374*

The results indicate that 94% of the respondents agree that government policies and guidelines on environment management are necessary pre-requisite in the successful implementation of the afforestation projects. However only 57% of the respondents agreed that their community supports enforcement/implementation of afforestation guidelines and policies, 29% of the respondents disagree while 14% are neutral. This means that despite the fact that most believe that government policies and protocols are important only 57% follow these guidelines. Additionally, 66% of the respondents agree that they were inspired by government policies to participate in afforestation projects, 26% were self-motivated while 8% were neutral. In terms of staffing only 30% of the respondents agree that the county governments have adequate staff needed to support the implementation and enforcement of afforestation policies and guidelines. The rest of the respondents (70%) were not confident that the county government has enough staff to support afforestation. Consequently only 52%

of the respondents believe that policies and guidelines around afforestation are effectively implemented in the community, 37% of the respondents disagree and 125 are neutral.

### 4.11 Correlation Between Sustainability and income, Attitude, capacity, network and government policies

**Table 4.25: Pearson Correlation**

| | Sustainability | Income | Attitude | Capacity | Network | Government Policies |
|---|---|---|---|---|---|---|
| Sustainability | 1 | | | | | |
| Income | 0.58 | 1 | | | | |
| Attitude | 0.70 | 0.07 | 1 | | | |
| Capacity | 0.61 | 0.53 | 0.23 | 1 | | |
| Networks | 0.45 | 0.31 | 0.25 | 0.51 | 1 | |
| Government Policies | 0.56 | 0.90 | 0.07 | 0.58 | 0.30 | 1 |

The Pearson correlation statistics was used to investigate the direction and strength of correlation between the dependent variable (sustainability) and independent variables (income, Attitude, capacity, network and government policies). The rule of the thumb guiding the interpretation of these statistics postulates as follows; +/- 0-0.24 = no correlation, +/-0.25-0.49 = a weak correlation, +/-0.5-0.74 = moderate correlation and +/-0.75-1 = strong correlation. The results indicate that income capacity and government policy have a positive moderate correlation with sustainability. The correlation coefficient for these variables is 0.58, 0.61 and 0.56 respectively. While attitude has a strong positive correlation with a coefficient of 0.70. However, network has a weak correlation with sustainability with a coefficient of 0.45.

### 4.12 Regression Analysis of Dependent and Independent Variables

Ordinary least square regression analysis was utilized to institute the association between dependent variable (sustainability) and independent parameters (income, Attitude, capacity, network and government policies). This section will look at model summary, Analysis of variance and the regression model. The regression analysis looks at the statistical significance of the independent variables, Analysis of Variance (ANOVA) looks at the overall significance of the model while model summary looks at the proportion of the dependent parameter elucidated by the selected independent parameters.

### 4.12.1 Model Summary

**Table 4.26: Model Summary**

| Model Summary | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .702a | 0.493 | 0.487 | 0.444 |

a Predictors: (Constant), income, Attitude, capacity, network and government policies.
b Dependent Variable: Sustainability

The model summary provides an estimate of the proportion of dependent variable explained by the explanatory variables. The R-square of 0.493 shows that 49.3% of the changes in the dependent variable sustainability is explained by the changes in the predictor variables Constant, income, Attitude, capacity, network and government policies.

### 4.12.2 Analysis of Variance

**Table 4.27: Analysis of Variance**

| ANOVA | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 5 | 73.49 | 14.70 | 74.42 | 0.000 |
| Residual | 382 | 75.45 | 0.20 | | |
| Total | 387 | 148.94 | | | |

a Dependent Variable: Sustainability
b Predictors: (Constant), income, Attitude, capacity, network and government policies

The analysis of variance (ANOVA) tests whether the model as set out in the research is statistically significant in predicting the values of the dependent variable. The statistic looks at the collective significance of the predictor variables on the dependent variable. The general rules for testing the statistical significance avers that the model is significant if the F-value is more than 10 and or if the p-value is less than 0.05. The F-value and P-value in the table above is (74.42 & 0.00) respectively. These values are beyond the minimum threshold; therefore the ANOVA statistic concludes that the model is statistically significant in explaining the changes in the dependent variable.

### 4.12.3 Regression Model

**Table 4.28: Regression Model**

| Independent variables | Coefficients | Standard Error | t Stat | P-value |
|---|---|---|---|---|
| Constant | 0.727 | 0.193 | 3.767 | 0.000 |
| Income | 0.319 | 0.075 | 4.223 | 0.000 |
| Attitude | 0.072 | 0.034 | 2.102 | 0.036 |
| Capacity | 0.313 | 0.044 | 7.181 | 0.000 |
| Network | 0.205 | 0.049 | 4.186 | 0.000 |
| Government Policies | -0.016 | 0.077 | -0.207 | 0.836 |

$Y = \beta o + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_{5+} \varepsilon$

$Y = 0.727 + 0.319 x_1 + 0.072 x_2 + 0.313 x_3 + 0.205 x_4$

Regression analysis indicate the individual relationship which subsist between the independent and dependent variables. The general rule for interpreting the results is that if the P-value < 0.05 then the parameter is statistically significant. The results indicate that there is a constant level of sustainability which is not dependent on the variables under study. This is consistent with the general expectation. It is expected that there would be some minimum level of adequate seedling, positive attitude towards afforestation, active shareholder participation in afforestation, increased tree cover on forest and crop land and resources to support afforestation within a society. The results also indicate that income has a positive statistically significant relation with sustainability (B=0.319, P=0.000). This means that a unit increase in the level of income results to increase in the sustainability of community-based afforestation projects.

The results indicate that peoples attitude have a positive link with participation in the sustainable afforestation projects (B=0.072, P=0.036). An increase in Knowledge and awareness on afforestation and interest in sustainable projects leads to an increase in community suitability. The capacity of the community is also found to have a positive relation with sustainability (B=0.313, P-0.00). An increase in afforestation skills and access to resources is linked to an increase in community sustainability. Network and sustainability has a positive relationship (B=0.205, p= 0.00). A rise in the number of Technical partners in afforestation and community joint efforts leads to an increase in the participation in afforestation projects and hence an increase in sustainability. Government policies hos no

statistically significant relationship (B=-0.016, P=0.836); No inferences can therefore be made on the variable.

### 4.13 Discussion of Research Findings

The regression results shows existence of a positive relationship between income and sustainability of community-based afforestation (CBA) projects. These conclusions are in agreement with the conclusions of the Liu and Huang (2013) who sought to find out the nexus between income and investment in conservation projects. Their study found that people with higher income earnings were more incentivized to invest in sustainability projects. These results are also accordant with the conclusions of Moktan et al., (2016) who denoted that the level of income affects investments in sustainability project. Their study concluded that people with higher earnings are probable of investing in afforestation because it is likely to have a higher return.

The study also concluded the existence of a statistically significant positive interconnection between people attitude and community sustainability. An increase in the attitude of the people towards afforestation leads to an increase in sustainability of the community projects. These conclusions are consistent with the outcomes of Tesfaye (2017) who found that positive local community perceptions and attitudes leads to increased afforestation. The results are also consistent with the assumptions of the Theory of Planned Behavior (TPB) (Ajzen, 2012) which avers that behavioral intentions are outcomes of the blend of an individual's viewpoint, norms, and deemed behavioral control.

The research also revealed a statistically significant positive tie-up between community capacity and participation in sustainability projects. These results agree with the findings of Chaskin (1999) who found that community capacity (human resources, organizational and societal capital) play a positive role in contributing to sustainability projects. The results also indicate existence of a positive link between network and sustainability of the rural based community afforestation. A rise in the number of external networks indicates an increase in the success of sustainable community projects. These outcomes are congruous with the conclusions of Tamayo (2017) who found a positive relationship between community collaborations and community afforestation projects. The results also confirm the conclusions of Sciabolazza *et al.,* (2017) who concluded that networks and collaborations lead to transfer of knowledge and successful administration of the afforestation projects. However, the results

found no statistically significant interconnection between government policy and sustainability of rural based afforestation projects.

The positive relationship between network, income, attitude and sustainability is a clear demonstration that the assumptions of the system theory hold. The theory avers that harmony between people, structures and environment. The interplay between these variables to achieve a common goal is a clear demonstration that the system theory hold. Additionally, the positive relationship between community capacity and sustainability demonstrates that the assumptions of sustainability theory are true. The theory avers that the capacity of the community determines how well the community takes care of its limited resources. Training on afforestation skills and skill transfer help the community to take care of the limited resources. This is because the theory postulates that sustainable development can only occur in an environment where there is a skill transfer and where these skills are used to manage the environment (Mbiti, 1996).

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATION

## 5.1 Introduction

This chapter deals with the summary, conclusions and commendations for further inquiries, this chapter will summarize the inferences made from the descriptive statistics, the summary of the correlation and the summary of the regression analysis. The chapter will also discuss the conclusions made from the research findings. The chapter will also suggest policy recommendations and areas for further studies.

## 5.2 Summary

The research attempted to find out the repercussions of socio-economic factors on sustainability of rural community-based afforestation initiatives in Nyatike Sub County in Migori County. Other supplementary objectives of the study included finding out how income sources influence sustainability of community-based afforestation (CBA) projects. The other goal was to determine the extent to which local people attitudes influence the sustainability of community-based afforestation (CBA) projects. The inquiry also attempted to institute how community capacity affect the sustainability of community-based afforestation (CBA) projects and finally the research attempted to assess the level at which networks and collaboration influence sustainability of community-based afforestation (CBA) projects. This segment provides the summary of the results based on the goals elucidated above.

### 5.2.1 Influence of Income on Sustainability of CBA Projects

The study found that income has a positive effect on the sustainability of community-based afforestation (CBA) projects in Nyatike, Migori County, Kenya. The results indicate that. The study found that 85% of the respondents agree that sustainability enterprises and businesses are highly profitable, additionally 86% of the respondents agree that afforestation business have attracted many people to participate in sustainability projects. The combined mean response was 3.934 while the standard deviation 0. 276. This implies that a majority of those interviewed agree that income has a positive influence on sustainability projects.

### 5.2.2 Influence of Local People's Attitude on Sustainability of CBA Projects

The research revealed a positive tie up between people's attitude and involvement in sustainability projects. The combined mean response is 3.08 while the standard deviation is 0.216, this means that a majority of the respondents are neutral about the constructs of

attitude. Meaning that these respondents could participate in sustainability projects even in the absence of external support. There is an internal drive to participate in sustainability projects; 64% of the respondents agree that afforestation is very key to our survival while respondents disagree (52%) that there are many challenges to uptake of afforestation projects in my community, with only 44% of the respondents agreeing with this statement.

### 5.2.3 Influence of Community Capacity on Sustainability of CBA Projects

The results found extant is a positive tie in between community capacity and the success of CBA Sustainable projects. The combined mean response is 3.544, while the standard deviation 0.458 which implies that a majority of respondents identified the concepts of capacity as the important contributors to the implementation of sustainability projects. 81% of the respondents agree that they have required skills and knowledge to support afforestation. Additionally, 85% of the respondents agree that the government is involved in enhancing the community's capacity to manage and implement sustainability projects in Nyatike.

### 5.2.4 Influence of Networks and Collaborations on Sustainability of CBA Projects

The study found that strong partnership (networks and collaborations) plays a key role in scaling afforestation initiatives. 87% of the respondents identified partnership as a critical success factor in scaling up afforestation projects in Nyatike. Additionally, 84% of the respondents prefer to work with partners in forestry projects. These results are confirmed by the combined mean of 3.992, standard deviation of 0.456, which implies that a majority of the respondents agree that network and collaboration support the scaling up of afforestation projects.

### 5.2.5 Influence of Government Policies and Regulations on Sustainability of CBA Projects

The inquiry established that most respondents agree that government policies and guideline affect sustainability of CBA projects, the combined mean responses was 3.4, while the standard deviation was 0.6374. Additionally, 94% of the respondents agree that government policies and guidelines on environment management are necessary pre-requisite in the successful implementation of the afforestation projects.

## 5.3 Conclusions

**Objective 1;** The research concluded that there is a statistically significant positive relation between income and sustainable community led afforestation. The entrepreneurial skills of community members, number of afforestation business in the community and income opportunities as a result of afforestation enterprises were found to have a positive relationship with sustainability.

People who earn their living through participating in sustainability projects like planting and selling trees, bee farming and fruit faming are more likely to support afforestation projects because their livelihood comes from the environment.

**Objective 2;** The research concludes an extant positive connection between people attitude and sustainable community led afforestation. Positive attitudes towards afforestation leads to increased conservation efforts and consequently increased participation on sustainability projects. Knowledge on afforestation, positive attitude towards the value of afforestation, level of motivation towards afforestation projects leads to increased afforestation in an area.

**Objective 3;** The research also inferred a positive relationship between capacity and sustainable community led afforestation. An increase in the community's capacity to manage sustainability projects increase and consequently leads to increased tree cover. Knowledge of community afforestation resources, and the joint efforts between government and community in afforestation projects lead to enhanced participation in CBA sustainable projects

**Objective 4;** The study concluded that an increase in the network and collaborations has a positive relationship with Sustainability of CBA Projects information about the existence of forest partners, assessment of the role of partnerships in afforestation and the presence of existing partnerships and collaborations enhances the success of sustainability projects.

## 5.4 Policy Recommendation

1. The results also indicate that most of the respondents agree that investments in afforestation business yield positive results. This then enhances their participation in sustainability projects. The study therefore recommends that awareness and support towards strengthening afforestation income opportunities should be increased to encourage famers to participate in tree related business opportunities. The extension officers should be financed to educate the farmers on sustainable tree based value chains and linkages with markets by enhancing private sector involvement in afforestation.

2. The inquiry also instituted existence of a positive link between attitude and afforestation, an increase in positive attitude leads to improved afforestation. The study therefore recommends increased trainings on behavior change to ensure that there is increased afforestation as well as interrogation of gender roles linked to women and men participation in afforestation.
3. Community capacity has been found to increase the chances of successful implementation of sustainability projects. The study also recommends that the government should invest in enhancing the capacity of the communities to engage in afforestation projects. This can be done through training and provision of seedlings and implements required to support afforestation activities. The government and partners should additionally increase investments towards improved water access and favorable land tenure systems that support afforestation as the two resources were significantly mentioned in the study.
4. Networks and collaborations have been found to play a key role in scaling up the afforestation projects. Collaborations between the residents and external players lead to skills transfer and hence increased participation. The study therefore recommends that there should be an increased and strengthened collaboration between the rural people and external afforestation experts including government, this will lead to increased afforestation.

### 5.5 Suggestion for Further Studies

The study found that there is a positive relationship between attitude and sustainability, however their recent studies indicate that there is no consensus on the direction of association. Andrade and Rhodes (2012) also found a positive relationship between attitude and sustainability. Whereas, Infield & Namara (2001) suggested that attitudes do not necessarily translate in pro-conservation behaviors. Their study found no evidence that attitude alone can contribute to improvement in sustainability projects. Therefore, the study proposes that an independent study be done to investigate the relationship between the attitude of the local people and participation in the sustainability projects.

The results also indicate that the number of men involved in afforestation activities are significantly more than the number of women involved in sustainability projects. A study should be conducted to unravel the reason why women are less involved in afforestation projects as compared to men. Therefore, a study should be conducted to find out the moderating role of women in afforestation projects. Finally the study suggests that an

independent study be conducted to find out the intervening role of government policies in participating in afforestation projects. Empirical evidence shows that government policies on land use and use of artificial trees could lead to the decreased incentive for the citizens to participate in afforestation projects. Therefore, a study needs to be conducted to determine the intervening relationship between policy and sustainability.

# REFERENCES


Abbot, J. I. O., Thomas, D. H. L., Gardner, A. A., Neba, S. E., & Khen, M. W. (2001). Understanding the links between conservation and development in the Bamenda Highlands, Cameroon. World Development, 29(7): 1115–1136

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2): 179–211

Ajzen, I. (2012). Martin Fishbein's legacy: The reasoned action approach. The Annals of the American Academy of Political and Social Science, 640(1): 11–27.

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In: D. Albarracı´n, B. T. Johnson, & M. P. Zanna (Eds.). The handbook of attitudes (pp. 173–221). Mahwah, NJ: Lawrence Erlbaum Associates.

Allendorf, T., Swe, K. K., Oo, T., Htut, Y., Aung, M., Allendorf, K., Hayek, L., Leimgruber, P., & Wemmer, C. (2006). Community attitudes toward three protected areas in Upper Myanmar (Burma). Environmental Conservation, 33(4): 344–352.

Andrade, G. S. M., & Rhodes, J. R. (2012). Protected areas and local communities: An inevitable partnership toward successful conservation strategies? Ecology and Society, 17(4): 14.

Aramo-Immonen H. (2013) Mixed Methods Research Design. In: Lytras M.D., Ruan D., Tennyson R.D., Ordonez De Pablos P., García Peñalvo F.J., Rusu L. (eds) Information Systems, E-learning, and Knowledge Management Research. WSKS 2011. Communications in Computer and Information Science, vol 278. Springer, Berlin, Heidelberg

Baral, N., & Heinen, J. (2007). Resources use, conservation attitudes, management intervention and park-people relations in the Western Terai landscape of Nepal. Environmental Conservation, 34(1): 64–72.

Beata, J., Hans P. K., Anandasivakumar, E. & Grazyna, P. S. (2014). Key competences of public sector project managers. 27th IPMA World Congress.

Boström, M. (2012). The problematic social dimension of sustainable development: The case of the Forest Stewardship Council. *International Journal of Sustainable Development and World Ecology*. https://doi.org/10.1080/13504509.2011.582891

Chaskin, J. R. (1999). Defining Community Capacity: A Framework and Implications from a Comprehensive Community Initiative.

Choudhary, S. A. (2018). The role of entrepreneurship in rural development

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. Annual Review of Psychology, 55, 591–621.

Chirwa, P. W., Mahamane, L., & Kowero, G. (2017). Forests, people and environment: some African perspectives§. *Southern Forests*. https://doi.org/10.2989/20702620.2017.1295347

Erbaugh, J. T., & Oldekop, J. A. (2018). Forest landscape restoration for livelihoods and well-being. In *Current Opinion in Environmental Sustainability*. https://doi.org/10.1016/j.cosust.2018.05.007

FAO. (2015). FAO, forests and climate change: working with countries to mitigate and adapt to climate change through sustainable forest management. Rome.

Fiallo, E. A., & Jacobson, S. K. (1995). Local Communities and protected areas: attitudes of rural residents towards conservation and Machalilla National Park, Ecuador. Environmental Conservation, 22(3): 241–249.

Frazier, B., Stoel, L. & Eckerson, N. (2013). Optimism for new business survival in rural communities: an institutional perspective. https://doi.org/10.1080/08276331.2013.876761

Fuller-Love, N., Midmore, P., Thomas, D., Henley, A. (2006). Entrepreneurship and rural economic development: A scenario analysis approach. https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.1108%2F13552550610687655

Gilmour, D. (2017). Forty years of community-based forestry. *A review of its extent and effectiveness.*

Goldring, E. & Sims, P. (2005). Modeling creative and courageous school leadership through district– community–university partnerships. Educational Policy, 19(1), 223–249.

Holmes, C. M. (2003). The influence of protected area outreach on conservation attitudes and resource use patterns: A case study from western Tanzania. Oryx, 37(3): 305–315.

Imedashvili, S., Ivchenko, P., & Kekua, A. (2013) Rural Entrepreneurship: Challenges and Opportunities.

Infield, M., & Namara, A. (2001). Community attitudes and behaviour towards conservation: An assessment of a community conservation programme around Lake Mburo National Park. Uganda, 35(1): 48–60.

Keenan, R. J., Reams, A. G., Achard, F., Freitas, V. J., Greinger, A., & Lindquist, E. (2015). Dynamics of global forest area: Results from the FAO Global Forest Resources Assessment 2015. https://doi.org/10.1016/j.foreco.2015.06.014

Kerzner. H, (2006). Project Management: A System Approach To Planning, Scheduling And Controlling. 9th Ed. John willy & Sons. UK.

Kideghesho, J. R., Røskaft, E., & Kaltenborn, B. P. (2007). Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. Biodiversity and Conservation, 16, 2213–2230.

Kobbail, R. A. A. (2011). Local People Attitudes towards Community Forestry Practices: A Case Study of Kosti Province-Central Sudan. doi:10.1155/2012/652693

Larson, L. R., Conway, A. L., Krafte, K. E., Hernandez, S. M., & Carroll, J. P. (2016). Community-based conservation as a potential source of conflict around a protected area in Sierra Leone. Environmental Conservation, 43(3): 242–252.

Magugu, J. W., Feng, S., Huang, Q., & Ototo, G. O. (2018). Socio-economic factors affecting agro-forestry technology adoption in Nyando, Kenya. *Journal of Water and Land Development*, *39*(1), 83–91. https://doi.org/10.2478/jwld-2018-0062

Marshall, N. A., Marshall, P. A., Abdulla, A., & Rouphael, T. (2010). The links between resource dependency and attitude of commercial fishers to coral reef conservation in the red sea. Ambio, 39(4): 305–313.

Massey, D. S., & Denton, N. A. (1993). American apartheid: Segregation and the making of the underclass. Cambridge: Harvard University Press.

Mbiti, J.S. (1996). African views on the universe. New York.

Merzel C, D'Afflitti J. Reconsidering community-based health promotion: promise, performance, and potential. Am J Public Health. 2003;93:557–574. [PMC free article][PubMed] [Google Scholar]

Midgley, G. (2003). System Thinking. Sage publishers-London. Our findings revealed that community forestry contributes to household income through harvesting and marketing of large trees, and non-wood forest products where markets are accessible. Household income, however, vary widely between rich and poor households with former capitalizing on commercial and later on subsistence products.

Moktan, M. R., Norbu, L., & Choden, K. (2016). Can community forestry contribute to household income and sustainable forestry practices in rural area? A case study from Tshapey and Zariphensum in Bhutan. *Forest Policy and Economics*. https://doi.org/10.1016/j.forpol.2015.08.011

Moktan, M. R., Norbu, L., & Choden, K. (2016). Can community forestry contribute to household income and sustainable forestry practices in rural area? A case study from Tshapey and Zariphensum in Bhutan. *Forest Policy and Economics*. https://doi.org/10.1016/j.forpol.2015.08.011

Nyaguthii, E. & Oyugi L. A.(2013). Influence Of Community Participation On Successful Implementation Of Constituency Development Fund Projects In Kenya: Case Study of Mea constituency. International Journal of Education and Research Vol. 1

Population Action International. (2011). Why Population Matters to Forests.

Porter, G. & Brown, J. W. (1991). *Global Environmental Politics.* (Westview Press, Boulder, Colorado)

Raeburn, J., Akerman, M., Chuengsatiansup, K., Mejia, F. & Oladepo, O. (2007). Community capacity building and health promotion in a globalized world. Health Promotion International, 21(S1): 84 – 90

Richard, A. Giliba, Emmanuel, K. Boon, Canisius J. Kayombo, Leonard I. Chirenje & Emmanuel, B. Musamba (2011) The Influence of Socio-economic Factors on Deforestation: A Case Study of the Bereku Forest Reserve in Tanzania, Journal of Biodiversity, 2:1, 31-39, DOI: 10.1080/09766901.2011.11884727

Ryan, S. J., Palace, M.W., Hartter, J. E., Diem, C. (2017). Population pressure and global markets drive a decade of forest cover change in Africa's Albertine Rift https://doi.org/10.1016/j.apgeog.2017.02.009

Pouliot, M., & Treue, T. (2013). Rural People's Reliance on Forests and the Non-Forest Environment in West Africa: Evidence from Ghana and Burkina Faso. *World Development*. https://doi.org/10.1016/j.worlddev.2012.09.010

Sah, J., & Heinen, J. (2001). Wetland resource use and conservation attitudes among indigenous and migrant peoples in Ghodaghodi Lake area, Nepal. Environmental Conservation, 28(4): 345–356.

Saunders, M., Lewis, P. & Thornhill, A. (2016). *Research methods for business students.* Harlow: Pearson Education Limited.

Sciabolazza, L. V., Vacca, R., Okraku, K. T., McCarty, C. (2017). Detecting and analyzing research communities in longitudinal scientific networks. https://doi.org/10.1371/journal.pone.0182516

Schirmer, J., & Bull, L. (2014). Assessing the likelihood of widespread landholder adoption of afforestation and reforestation projects. Global Environmental Change. https://doi.org/10.1016/j.gloenvcha.2013.11.009

Sloan, S., & Sayer, J. A. (2015). Forest Resources Assessment of 2015 shows positive global trends but forest loss and degradation persist in poor tropical countries. In *Forest Ecology and Management*. https://doi.org/10.1016/j.foreco.2015.06.013

St. John, F. A. V, Edwards-Jones, G., & Jones, J. P. G. (2010). Conservation and human behaviour: Lessons from social psychology. Wildlife Research, 37, 658–667.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3): 407–424.

Tabarelli, M., Pinto, L., Silva, J., Hirota, M., & Bedeˆ, L. (2005). Challenges and opportunities for biodiversity conservation in the Brazilian Atlantic Forest. Conservation Biology, 19(3): 695–700.

Pouliot, M., & Treue, T. (2013). Rural People's Reliance on Forests and the Non-Forest Environment in West Africa: Evidence from Ghana and Burkina Faso. *World Development*. https://doi.org/10.1016/j.worlddev.2012.09.010

Sloan, S., & Sayer, J. A. (2015). Forest Resources Assessment of 2015 shows positive global trends but forest loss and degradation persist in poor tropical countries. In *Forest Ecology and Management*. https://doi.org/10.1016/j.foreco.2015.06.013

Tamas, A., Yukon. W, & Almonte, S. (2000). System theory in community development. Ontario.

Tamayo, L. (2017). Keys to design networks and collaborative communities.

Taylor, P. & García-Barrios, R. (1995). The social analysis of ecological change: from systems to intersecting processes. *Social Science Information* 34 (1):5-30 (1995

Tesfaye, S. S. (2017) Assessment of Local Community Perception of and Attitude Towards Participatory Forest Management (PFM) System and Its Implications for Sustainability of Forest Condition and Livelihoods: The Case of Chilimo-Gaji Forest in Dendi District, West Shewa Zone, Oromia, Ethiopia. J Earth Sci Clim Change 8: 382. Doi: 10.4172/2157-7617.1000382.

Waylen, K. A., McGowan, P. J. K., & Milner-Gulland, E. J. (2009). Ecotourism positively affects awareness and attitudes but not conservation behaviours: A case study at Grande Riviere, Trinidad. Oryx, 43(3): 343–351.

WCED, (1987). Economic and social development that meets the need of the current and future generation.

White, L. (1996). The historical roots of our ecological crisis. Routledge, New York-USA

World Bank, (1986). The role of community participation in development planning and project management. Report of a Workshop on Community Participation held in Washington D.C. Economic Development Institute.

World Bank, (2009). The capacity development results framework: A strategic and results oriented approach to learning for capacity development, Washington.

# APPENDICES

## Appendix 1: Transmittal Letter

Irene Ojuok

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7th July 2020

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**TO WHOM IT MAY CONCERN**

I am a Masters student at the University of Nairobi, currently conducting a research as a partial fulfilment of the award of the requirements for the Degree of Masters of Arts in Project Planning and Management.

My research topic is "Influence of socio economic factors on sustainability of rural community based afforestation projects in Nyatike sub-county, Migori County.

The aim of this letter is to request for your participation as a respondent by giving feedback to the attached questionnaire as accurately as possible. Selection of respondents in this exercise if through random sampling and the questionnaire will take approximately 20 minutes. However, you are under no obligation to participate in this study. Anonymity and confidentiality is assured and there is No part of the questionnaire will require you to fill in your name or identification details. The data collected by the researcher will be used for academic purposes only.

You are kindly requested to participate in order to make this research inquiry a success

Your cooperation is highly appreciated

Irene Ojuok

Reg. L50/66367/2013

University of Nairobi, Department of Open Learning

## Appendix 2: Research Questionnaire

*(To be administered to any household member above 18 years old preferably the household head)*

The aim of this inquiry is to establish the "Influence of socio economic factors on sustainability of rural community based afforestation projects in Nyatike sub county, Migori County"

**Do you agree to take part in the research?** Yes ____ No ____

Please indicate the current status by ticking the appropriate option:

**Part 1: Socio Demographic Information**

1. **Gender**

a) Male ( )

b) Female ( )

2. **Age**

18-28 ( )

29-39 ( )

40-49 ( )

50-59 ( )

Above 60 ( )

3. **Marital Status**

a) Single ( )

b) Married ( )

c) Other ( )

4. **What is your highest attained level of education?**

None ( )

Primary ( )

Secondary ( )

Tertiary ( )

**5. What is the nature of your occupation?**

None ( )

Casual Labor ( )

Formal employment ( )

Self-employed ( )

**6. What is your family's major source of income?**

Agriculture ( )

Salary ( )

Business ( )

Casual labour ( )

Others (specify) ( )

**7. On average, what is your monthly earnings from all the sources that you have?**

<5000 ( )

5000 -10,000 ( )

10,000 – 15, 000 ( )

15,000 – 20,000 ( )

>20,000 ( )

**8. How many members are you in your household?**

<3 ( )

3 - 7 ( )

7 – 11 ( )

>11 ( )

**9. For how many years have you lived in this area**

<5 ( ) 10 – 15 ( )

5 - 10 ( ) >15 ( )

**<u>Part 2: Influence of income sources on sustainability of CBA projects</u>**

**What key income sources exist in/through undertaking afforestation initiatives in your community?**

Charcoal selling ( )

Sale of Fruits ( )

Sale of fuel wood ( )

Bee keeping ( )

Sale of medicinal herbs ( )

Sale of tree seedlings ( )

Others ( )

**Do you take part in any of the above business opportunities?** Yes ( ) No ( )

**In your opinion, between men and women who are mostly involved in the afforestation related business.** Men ( ) Women ( )

**In the below table, please read the given statements and give your opinion by ticking (√) in the relevant column:**

**KEY: 5 SA-Strongly Agree, 4 A-Agree, 3 N – (Neutral) 2 D-Disagree, 1 SD-Strongly Disagree.**

| No. | STATEMENTS | SA | A | N | D | SD |
|---|---|---|---|---|---|---|
| 1. | Tree based enterprises/business are rewarding or highly profitable | | | | | |
| 2. | Afforestation business opportunities have attracted many to participate in tree growing and or protection | | | | | |
| 3. | I would prefer undertaking afforestation only if it brings additional income in my household | | | | | |
| 4. | Government is supportive of afforestation business enterprises | | | | | |
| 5. | There are no barriers towards community groups participating in afforestation enterprises | | | | | |

**Part 3: Influence of Local people's attitude on sustainability of CBA projects**

**Do you have knowledge on afforestation?** Yes ( ) No ( )

**If your answer is yes above, please share where you accessed this knowledge.**

Formal education (school) ( )

Awareness meetings ( )

Training by extension officers ( )

Peer learning ( )

Indigenous knowledge ( )

Media ( )

Others; _____

In your opinion, are the community members of Nyatike actively involved in afforestation activities?

**Yes ( ) No ( )**

Do you feel human deforestation activities are causing destruction to the environment and threat to lives and livelihoods?

**Yes ( ) No ( )**

Are you concerned with unsustainable charcoal burning in your community?

**Yes ( ) No ( )**

Have you ever participated in community afforestation projects?

**Yes ( ) No ( )**

**In the below table, please read the given statements and give your opinion by ticking (√) in the appropriate column:**

**KEY: 5 SA-Strongly Agree, 4 A-Agree, 3 N – (Neutral) 2 D-Disagree, 1 SD-Strongly Disagree**

| No. | STATEMENTS | SA | A | N | D | SD |
|---|---|---|---|---|---|---|
| 1. | Limited knowledge on benefits of trees leads to low community participation in afforestation | | | | | |
| 2. | Afforestation is very key to our survival | | | | | |
| 3. | There are many challenges to uptake of afforestation projects in my community | | | | | |
| 4. | Community afforestation groups are critical in success of tree planting and forest conservation & protection in my community | | | | | |
| 5. | Men are most involved in afforestation compared to women | | | | | |

**Part 4: Influence of Community Capacity on sustainability of CBA projects**

**Are there existing resources that support community participation in afforestation activities?** Yes ( ) No ( )

**If your answer is yes above, which are the resources have been most beneficial in scaling afforestation efforts.**

Access to Land ( )

Availability of Water ( )

Extension services (Government and other partners) ( )

Access to Input (seeds, tools, seedling tubes etc.) ( )

Indigenous knowledge ( )

Environmental groups/CFAs ( )

Human Resource/man power ( )

Regulations and policies supporting forestry ( )

Others; _____

**In the below table, please read the given statements and give your opinion by ticking (√) in the appropriate column:**

**KEY: 5 SA-Strongly Agree, 4 A-Agree, 3 N – (Neutral) 2 D-Disagree, 1 SD-Strongly Disagree**

| No. | STATEMENTS | SA | A | N | D | SD |
|---|---|---|---|---|---|---|
| 1. | I have required skills and knowledge to support afforestation | | | | | |
| 2. | I can easily access services and inputs required for afforestation as per need | | | | | |
| 3. | The government highly supports my community to undertake afforestation activities | | | | | |
| 4. | The laws and regulations provided by government or made by community support afforestation projects | | | | | |
| 5. | Majority of people in Nyatike are members of community environment groups | | | | | |

**Part 5: Influence of Networks and Collaborations on sustainability of CBA projects**

**Are there partners within your community supporting/involved in afforestation projects?**

Yes ( ) No ( )

**If your answer is yes above, who are the partners involved in scaling community afforestation efforts.**

Government ( )

CSO/NGOs ( )

Individual Environment champions ( )

Private sector players ( )

Churches/Faith based institutions ( )

Community Environmental groups/CFAs ( )

Media ( )

Others; _____

**In the below table, please read the given statements and give your opinion by ticking (√) in the appropriate column:**

**KEY: 5 SA-Strongly Agree, 4 A-Agree, 3 N – (Neutral) 2 D-Disagree, 1 SD-Strongly Disagree**

| No. | STATEMENTS | SA | A | N | D | SD |
|---|---|---|---|---|---|---|
| 1. | Strong partnerships play a key role scaling afforestation initiatives | | | | | |
| 2. | Communities in Nyatike have established strong networks and collaborations that champion afforestation | | | | | |
| 3. | Weak coordination and collaborations between community and partners result to unsuccessful afforestation | | | | | |
| 4. | Increased resources for afforestation can be linked to strong networks and collaborations | | | | | |
| 5. | Community prefers to work with partners for success in forestry projects | | | | | |

**Part 6: Sustainability of Community Based Afforestation (CBA) projects**

Are the community afforestation projects in Nyatike able to continue supporting tree planting initiatives without external support?

**Yes _____** **No _____**

I personally take part/support afforestation activities within my farm land without external push/pressure and support

**Yes _____** **No _____**

If your response is No above, please mention why _____

**In the below table, please read the given statements and give your opinion by ticking (√) in the appropriate column:**

**KEY: 5 SA-Strongly Agree, 4 A-Agree, 3 N – (Neutral) 2 D-Disagree, 1 SD-Strongly Disagree**

| No. | STATEMENTS | SA | A | N | D | SD |
|---|---|---|---|---|---|---|
| 1. | Over 10 % of forest and farm lands in Nyatike is forested/ on trees | | | | | |
| 2. | My Community generally like participating in tree planting/growing | | | | | |
| 3. | There are active community groups promoting afforestation in Nyatike | | | | | |
| 4. | There is increase in afforestation related income opportunities over the last 5 years | | | | | |
| 5. | More partners are supporting afforestation activities in my community with increased resource allocations | | | | | |
| 6. | In your view have community affairs impacted negatively on tree/forest cover | | | | | |

**Part 7: Influence of government policies and regulations on sustainability of CBA projects**

Are there government policies/guidelines/regulations you know of that protect communities undertaking afforestation activities? Yes ( ) No ( )

**In the below table, please read the given statements and give your opinion by ticking (√) in the appropriate column:**

**KEY: 5 SA-Strongly Agree, 4 A-Agree, 3 N – (Neutral) 2 D-Disagree, 1 SD-Strongly Disagree**

| No. | STATEMENTS | SA | A | N | D | SD |
|---|---|---|---|---|---|---|
| 1. | Government policies and guidelines on environment management are key is success of afforestation projects | | | | | |
| 2. | My community supports enforcement/implementation of afforestation guidelines and policies | | | | | |
| 3. | Existence of government policies and guidelines on afforestation influenced my interest in participating in afforestation projects | | | | | |
| 4. | The county government have adequate staff supporting implementation and enforcement of afforestation policies and guidelines | | | | | |
| 5. | Policies and guidelines around afforestation are effectively implemented in community | | | | | |

**Thank you for participating in the survey.**