PARTICIPATION OF SMALLHOLDER FARMERS IN CARBON MARKET PROJECTS IN UGANDA: AN EXPLORATORY STUDY ON THE ROLE OF FINANCIAL LITERACY COMPETENCIES

BY

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THIS DISSERTATION IS PRESENTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A BACHELOR OF BUSINESS ADMINISTRATION AT UGANDA CHRISTIAN UNIVERSITY

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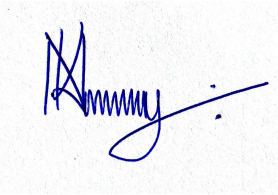
DECLARATION

I, Kristina Nabatanzi, hereby declare that this dissertation titled "Participation of Smallholder Farmers in Carbon Market Projects in Uganda: An Exploratory Study on the Role of Financial Literacy Competencies" is my original work and has not been presented for the award of a degree or any other academic qualification in any other university or institution of higher learning. All the work of other individuals or parties that has been used in the compilation of this research report has been duly acknowledged in accordance with the standard academic practices. This research report is submitted in partial fulfilment of the requirements for the award of a Bachelor of Business Administration degree at Uganda Christian University.

Signed……  ……

APPROVAL

This is to certify that this dissertation report titled, "Participation of Smallholder Farmers in Carbon Market Projects in Uganda: An Exploratory Study on the Role of Financial Literacy Competencies" authored by Kristina Nabatanzi, a student of Bachelor of Business Administration at Uganda Christian University, has been conducted under my supervision. To the best of my knowledge, this dissertation is a result of the student's original research efforts and has met the requirements and academic standards of the university. I hereby approve this dissertation for submission to the School of Business.

Signature .....

MR. KISENYI VINCENT

(Academic Supervisor)

Date 4/09/2025

DEDICATION

This research is dedicated to my father, Professor and Architect Stephen Mukiibi. Thank you for being a phenomenal inspiration and for your unflinching support and love. Thank you for being the true testament of all that is possible for me in this world. I dare to dream, because I have an amazing father who never settled for less. May this report make you proud, Professor!

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In a special way, I am grateful to my family and close friends for their prayer, patience, love and support. Thank you for your unwavering faith in me through every draft, deadline, and moment of uncertainty.

May God bless you all abundantly!

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LIST OF KEY DEFINITIONS

Smallholder Farmers	These are pastoralists, forest keepers and fishers, who manage areas varying from less than one hectare to 10 hectares. These smallholders are characterized by family-focused motives such as favoring the stability of the farm household system, using mainly family labor for production and using part of the produce for family consumption. (FAO, 2013)
Carbon Markets	These are carbon pricing mechanisms that enable governments and non-state actors to trade greenhouse gas emission credits, offer nations like Uganda the opportunity to monetize emission reductions through tradeable carbon credits. (UNEP, 2024)
Financial Literacy	A measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions (Remund, 2010)
Financial Literacy Competencies	An individual's ability to understand and apply financial concepts, coupled with the confidence to manage personal finances effectively and make informed decisions that enhance their well-being.
Participation	The active involvement of individuals or groups in decisions, processes and activities that affect them. It incorporates the right, opportunity and ability to contribute ideas, express preferences, share responsibilities

	and influence outcomes in social, economic, political, or organizational contexts.
Carbon credits	A carbon credit represents a reduction of 1 metric ton in greenhouse gas emissions to compensate for 1 metric ton of emissions made somewhere else. (Conservation International, 2025)
Climate-Smart Agriculture	This is a set of agricultural practices and technologies which simultaneously boost productivity, enhance resilience and reduce GHG emissions. (World Bank, 2024)

LIST OF ACRONYMS

BOU	Bank of Uganda
UFLA	Uganda Financial Literacy Association
AFOLU	Agriculture, Forestry, and other Land Use
ECOTRUST	Environmental Conservation Trust of Uganda
MOFPED	Ministry Of Finance Planning and Economic Development
NDC	Nationally Determined Contribution
NFIS II	National Financial Inclusion Strategy II
FAO	Food and Agricultural Organization of the United Nations
OECD/INFE	Organisation for Economic Co-operation and Development/ International Network on Financial Education
PISA	Programme for International Student Assessment
SACCO	Saving and Credit Cooperative Organisations
VSLA	Village Savings and Loan Associations
LASPNET	Legal Aid Service Providers Network
ULS	Uganda Law Society
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
CSA	Climate Smart Agriculture
UBOS	Uganda Bureau of Statistics

MWE	Ministry of Water and Environment
UNEP	United Nations Environment Programme
NDP	National Development Plan
SDG	Sustainable Development Goal
GHG	Greenhouse Gas
SMS	Short Message Service
GAL	Gender and Land Sensitivity
RDF	Rural Development Fund Uganda

ABSTRACT

The purpose of this dissertation was to examine the role of financial literacy competencies in the participation of smallholder farmers in carbon market projects in Uganda. The study objectives were to determine the relationship between Knowledge of Record Keeping, Contractual Literacy, Risk management and smallholder farmer participation in carbon market projects in Uganda. The study employed a descriptive qualitative design, making use of a structured literature review to analyze secondary data without primary collection. The study utilized a desk-based approach while leveraging secondary data from 2019 to 2025. Attention was drawn to regions such as Central, Western and South-western Uganda, where carbon market projects are currently ongoing. The results indicated that each of the financial literacy competencies had a positive and significant relationship with smallholder farmer participation in carbon market projects. It was also observed that carbon market projects that incorporated gender and youth-based interventions within their programs exhibited higher levels of participation among their smallholder farmers.

It was recommended that carbon project developers should incorporate record keeping modules for farmers at the onboarding stage, tailored to suit various financial literacy levels of smallholder farmers. The Uganda Carbon Market Association, in collaboration with carbon project developers can design simplified contract template guised for smallholder farmers, translated to local languages and supported by trained extension workers. Additionally, the Uganda Carbon Bureau, alongside the Bank of Uganda, should promote Carbon Farming Savings and Insurance Schemes by financing existing initiatives that buffer farmers against carbon-farming related shocks and support investment in diversification strategies such as agroforestry and biogas.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This study sought to explore the role of financial literacy competencies in enabling smallholder farmers to meaningfully participate in carbon market projects in Uganda. As global efforts to combat climate change increasingly turn to carbon offset initiatives, smallholder farmers who are often stewards of vast natural resources remain underrepresented in these markets. This research aimed to assess how knowledge of record keeping, contract literacy, and risk management, influence smallholder farmer participation in carbon credit schemes. This study hopes to inform strategies that empower rural communities to access sustainable income streams while contributing to environmental conservation. It also covers the problem statement, purpose, objectives, research questions, scope, significance, justification and Conceptual Framework (CF) for the study.

1.2 Background of the Study

In an effort to transition to a low carbon and climate resilient economy, Uganda has set an economy-wide, National Development Contribution (NDC) target of 24.7% reduction below the Business As Usual (BAU) by 2030. The Agriculture, Forestry, and Other Land Use (AFOLU) is projected to contribute 82.7% of the total mitigation results by 2030, placing smallholder farmers who constitute more than 70% of Uganda's agricultural labour force (UBOS, 2021), at the heart of Uganda's climate strategy (Ministry of Water and Environment, 2022).

Pivotal to Uganda's operational blueprint of stimulating private sector climate financing, is the use of carbon markets (Eastern Africa Alliance on Carbon Markets and Climate Finance, 2023).

Carbon markets as defined by the United Nations Environment Programme (UNEP), are carbon pricing mechanisms that enable governments and non-state actors to trade greenhouse gas emission credits. These mechanisms offer nations like Uganda the opportunity to monetize emission reductions through tradeable carbon credits. Uganda is one of Africa's carbon market frontrunners, with a total of over 33 million carbon credits issued from the Clean Development Mechanism (CDM) and Voluntary Carbon Market (VCM) standards (Eastern Africa Alliance on Carbon Markets and Climate Finance, 2023). Ugandan community-led carbon projects such as Trees for Global Benefit and Youth Go Green, have not only contributed to the global carbon market landscape but have also illustrated how rural participation can yield measurable environmental benefits while cultivating socio-economic potential (Runfola et al., 2020).

While the sustainability of such initiatives often hinges on community involvement, with this study, I seek to uncover an even deeper layer of this conversation by proposing that beyond basic involvement, informed and educated participation is required. Evidence from the latest audit report issued by Plan Vivo (a globally recognized certification body for sustainable land use projects) on the Trees for Global Benefits project, revealed delays in carbon payments due to inconsistent financial details given by farmers concerning bank account information, registered phone numbers for mobile payments, and spelling of names (Plan Vivo Foundation, 2019, p.6). While these findings demonstrate a lack of familiarity with formal financial systems and digital transaction protocols, they also reveal a deeper challenge in data entry and record keeping. This financial literacy gap among the smallholder farmers not only disrupts benefit realization but also undermines trust and continued participation.

Similar literacy challenges have been reported in the Lake Victoria Watershed Agroforestry Carbon Project where it was discovered that farmers struggled to interpret contract terms despite

the introduction of technological innovations to simplify processes (Trees for the Future, 2025). Powers et al. (2025, p. 6), in their study, Smallholder Farmer Engagement in Carbon Credit Projects: Views from the Field to Guide High-Integrity Projects, discovered that, "in all the focus groups with farmers in projects where revenue from carbon credit sales were part of the benefit sharing agreement, farmers expressed confusion about how payment amounts and timing were determined".

The insights above raise important questions about the financial literacy preparedness of smallholder farmers participating in carbon market projects. This study therefore seeks to determine the influence that smallholder farmer's knowledge of record keeping, risk management and contract literacy have on their participation in carbon market projects in Uganda.

1.3 Statement of the Problem

Uganda's commitment to achieving a 24.7% reduction in greenhouse gas emissions by 2030, as stipulated in its updated Nationally Determined Contribution (NDC), places smallholder farmers at the core of climate mitigation endeavours due to their land-based practices. Even while farmers play such a central role in the climate change fight, they continue to face significant barriers to participating effectively in carbon market projects. One of the prevailing challenges is the lack of financial literacy among farmers. This knowledge gap has specifically been identified in smallholder farmers who have had trouble in understanding carbon project contracts, managing irregular carbon income, and evaluating long term carbon farming benefits (ECOTRUST, 2021).

Despite the national efforts to promote financial inclusion through initiatives such as community banking, these interventions still fail to address the specialized expertise required for carbon

finance. Overlooked competencies include carbon project related record keeping, contract literacy, and risk management (Kilimo Trust, 2020).

Limited exploration has been done on how these financial literacy gaps impact smallholder farmer participation in carbon market projects. The disparity between the financial literacy competencies required for carbon market participation and the training currently provided has resulted in diminished project performance, participation shortfalls, and unexploited avenues for rural development. If unaddressed, it jeopardizes Uganda's climate targets, erodes trust in carbon projects, and perpetuates inequities in climate finance access.

This study responds to a critical knowledge gap by exploring how financial literacy competencies influence smallholder farmers' participation in carbon markets. Its findings aim to inform inclusive, farmer-centered interventions aligned with Uganda's Fourth National Development Plan (NDP IV), the African Union's Agenda 2063, and the Sustainable Development Goals, specifically SDG 13 (Climate Action) and SDG 1(No Poverty).

1.4 The Purpose of the Study

The purpose of this study is to examine how financial literacy competencies influence the participation of smallholder farmers in carbon market projects in Uganda.

1.5 Study Objectives

The following were the objectives of the study:

1.5.1 To determine how smallholder farmer's knowledge of record keeping influences their participation in carbon market projects in Uganda.

1.5.2 To examine how smallholder farmer's level of contract literacy influences their participation in carbon market projects in Uganda.

1.5.3 To evaluate how smallholder farmer's knowledge of risk management influences their participation in carbon market projects in Uganda

1.6 Research Questions

The following research questions served as an exploratory roadmap for this study:

1.6.1 How does smallholder farmer's knowledge of record keeping influence their participation in carbon market projects in Uganda?

1.6.2 How does the level of contract literacy of smallholder farmers influence their participation in carbon market projects in Uganda?

1.6.3 In what way does smallholder farmer's knowledge of risk management influence their participation in carbon market projects in Uganda?

1.7 Scope of the Study

1.7.1 Content Scope: The independent variable for this study was **Financial Literacy Competencies**, which were measured by smallholder farmer's knowledge of record keeping, contract literacy and risk management. The dependent variable was **Participation of Smallholder Farmers in Carbon Market Projects in Uganda**, which was examined using Arnstein's Ladder of Citizen Participation to determine the level of smallholder farmer involvement in carbon market projects. This study explored the concept of financial literacy competencies from the perspective of small holder farmers and analyzed how these competencies influence their participation in

carbon market projects within the Ugandan context.

1.7.2 Geographical Scope: The geographical focus of this study was Uganda, with emphasis laid on regions where smallholder farmers are currently actively engaged or have potential to engage in carbon market projects. These regions are Central, Western and South-western Uganda where agroforestry, reforestation, and sustainable land management practices are being promoted.

1.7.3 Time Scope: This study covered the period from 2015 to 2025. This timeframe sufficiently encapsulated recent developments in Uganda's climate finance landscape, including the revision of its Nationally Determined Contributions (NDCs), the expansion of voluntary carbon market activities, and the implementation of the National Financial Inclusion Strategy II (NFIS II) targeting underserved populations.

1.8 Significance of the Study

This study contributes to the academic body of research by advancing the global understanding of the role that financial literacy competencies play in carbon market participation, particularly in developing countries. This study provides key insights for developing tailored financial literacy initiatives to enhance smallholder farmer participation in carbon market projects. On a national level, this study provides key learnings to support Uganda's endeavors of achieving its National Development Contribution (NDC) targets and Vision 2040 sustainability goals by encouraging greater participation in carbon markets.

The findings from this study also aid the activities of the Carbon Market Association of Uganda by contributing vital carbon farming observations that have the potential to improve project implementation strategies. For financial institutions, this study facilitates the design of targeted financial products to ensure inclusivity, and support sustainable finance. For smallholder farmers,

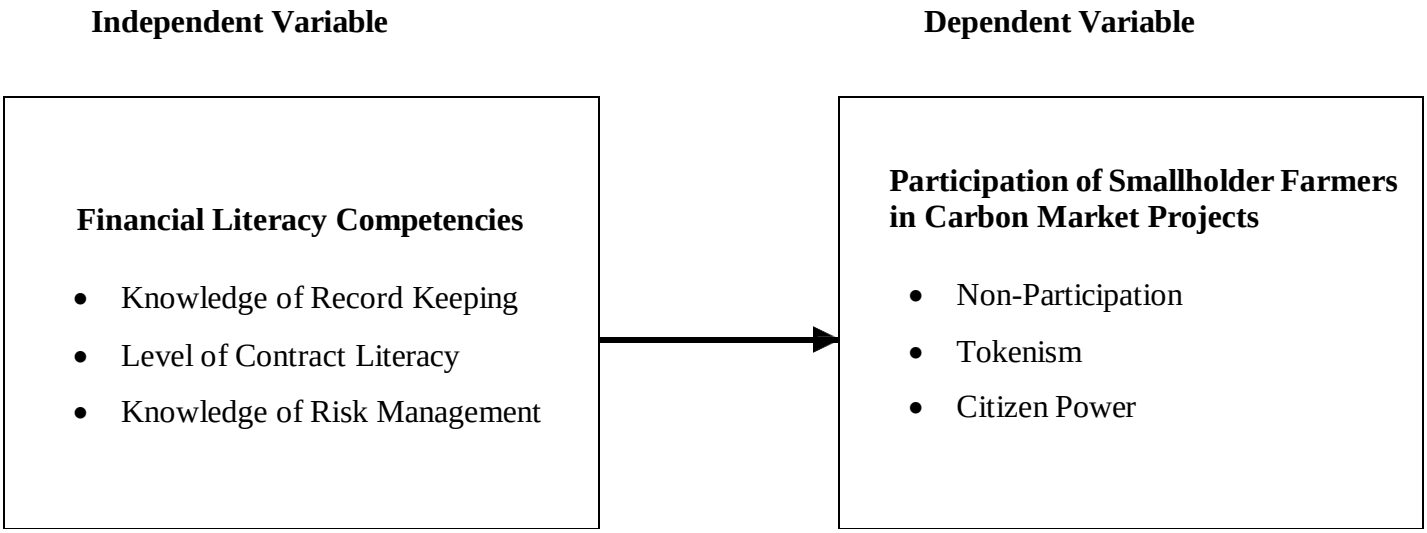
the insights from this study could improve their confidence in participating in carbon markets by advocating for their carbon financial literacy. This would result in income growth for the smallholder farmers, improved climate change adaptation and community development.

1.9 Justification of the Study

This study responds to the rising necessity to close the gap between financial literacy and the participation of smallholder farmers in carbon market projects in Uganda. As the need for climate finance involvement grows, making sure that farmers have the required financial literacy competencies to meaningfully participate in carbon projects is essential for sustainable environmental impact. By establishing the influence that financial literacy competencies have on smallholder farmer participation in carbon market projects, this study provides key findings that refine carbon program design, inform policy and promote sustainable benefit sharing within carbon projects.

1.10. Conceptual Framework

Figure 1.1: Conceptual Framework Applied in this Study showing the relationship between Financial Literacy Competencies and Participation of Smallholder Farmers in Carbon Market Projects



Source: Adopted from the academic works of Dhuule (2018); Blum (2024) and Arnstein's Ladder of Citizen Participation (1969)

1.10.1 Independent Variable: Financial Literacy Competencies

The following components of the independent variable were studied.

1.10.1.1 Knowledge of Record Keeping

This involved determining smallholder farmers' knowledge in tracking and noting down financial and non-financial information related to carbon projects.

1.10.1.2 Level of Contract Literacy

This involved establishing smallholder farmers' ability to interpret carbon project contracts, negotiate terms and make informed decisions while taking part in carbon project partnerships. This interpretation is derived from the definition of contract literacy as articulated by Vaaland & Owusu, (2015).

1.10.1.3 Knowledge of Risk Management

This was centered on determining smallholder farmers' ability to assess and manage risks associated with participating in carbon market projects.

1.10.2 Dependent Variable: Smallholder Farmer Participation in Carbon Markets.

This examines the quality of smallholder farmer participation in carbon markets based on their levels of involvement in decision making and given responsibilities. The levels of participation of various smallholder farmers in carbon market projects are assessed using Arnstein's ladder of citizen participation.

1.10.1.4 Level 1: Non-Participation

Here smallholder farmers are included in carbon projects only to legitimize external decisions (manipulation) or are passively informed of proceedings without tools for engagement (therapy).

1.10.1.5 Level 2: Tokenism

At this level, smallholder farmers are informed or consulted about project activities but lack influence. For example, the farmers may be told about carbon payments (informing), asked for input on suitable remittance methods, however, without influence (consultation), or they may simply be represented by intermediaries with limited authority (placation).

1.10.1.6 Level 3: Citizen Power

At this level farmers actively shape and steward carbon projects. They collaborate with developers (partnership), manage funds through cooperative societies (delegated power), or lead project governance (citizen control).

1.11 Summary

This chapter provides the foundation for the study by presenting the background and context of carbon market participation among smallholder farmers in Uganda. It emphasizes the increasing relevance of financial literacy in enabling farmers to engage effectively in climate finance initiatives. The problem statement highlighted a critical gap: although carbon market opportunities exist, many farmers lack the financial literacy competencies necessary to access and benefit from them.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses both the theoretical framework and empirical literature on Participation of Smallholder Farmers in Carbon Market Projects. It also analyzes the study variables namely; smallholder farmer's knowledge of record keeping, risk management and level of contract literacy, in relation to their participation in carbon projects. The study objectives are explored in relation to the variables.

2.2 Theoretical Framework

This study is hinged on a theoretical framework that draws insights from the Human Capital Theory (Becker, 1993; Schultz, 1961), the Financial Capability Model (Sherraden, 2013) and Arnstein's Ladder of Citizen Participation (Arnstein, 1969). These theories provide rich multidimensional perspectives through which the financial literacy competencies are analyzed as not only assets but also decision-making enablers in the context of smallholder farmer participation in carbon market projects.

2.2.1 Human Capital Theory

The Human Capital Theory, as introduced by Theodore Schultz and expounded on by Gary Becker, posits that investments in education, training, health, and other personal development activities augment an individual's productivity, resulting in higher earnings, elevated economic outcomes, and societal benefits (Becker, 1993; Schultz, 1961).

The Human Capital Theory rests on three core concepts;

2.2.1.1 Capital as an Investment: Becker articulates, "Expenditures on education, training, medical care, etc., are investments in capital. These are not simply costs but investments with valuable returns that can be calculated" (Becker 1964, p.1). He recognizes that these investments come with upfront costs such as time and money, however, he asserts that the yields (higher wages and better decision-making) are far greater than the costs incurred (Becker, 1964).

2.2.1.2 Productivity and Economic Returns: The Human Capital Theory asserts that, "The acquired abilities of people—skills, knowledge, and health—are a form of capital that makes them more productive" (Schultz, 1961, p. 2). It enables individuals to perform tasks more efficiently, solve problems and make informed decisions, which translates into economic benefits. Schultz (1964, p.5) writes, "Traditional farmers are not poor because they are backward. They are poor because they do not have access to the knowledge that would enable them to increase their output".

2.2.1.3 Long-Term Perspective: This theory explains that, "The returns to human capital are spread over the working life of the individual, unlike physical capital, which depreciates rapidly" (Becker, 1964, p. 15). This speaks to the long run sustainable development that investment in human capital awards individuals.

The Human Capital theory framework creates a connection between skill acquisition and economic participation and thus it offered a relevant lens from which to analyse the impact of the financial literacy competencies on the carbon trade participation.

2.2.2 Financial Capability Model

The Financial Capability Model was proposed by Margaret S. Sherraden in 2013. It is a framework

that synthesizes financial knowledge, skills and access to financial opportunities to advance financial well-being, precisely for underserved populations. Sherraden (2013, p.4) defines financial capability as, "the combination of the ability to act and the opportunity to act in ways that contribute to financial functioning". She elucidates that financial capability is more than having financial literacy or knowledge, it also comprises practical skills and access to resources.

The model consists of two key components;

2.2.2.1 Ability to Act (Financial Knowledge and Skills): This expounds on the internal aptitude to manage finances such as budgeting, saving, controlling credit and debt to mention but a few. Sherraden posits that financial education and guidance are vital in cultivating these skills.

2.2.2.2 Opportunity to Act (Financial Access and Inclusion): This draws attention to external factors, such as access to beneficial and affordable financial products and services, institutional structures and policies as well as socioeconomic and environment conditions. This component of the model lays emphasis on the fact that financial knowledge must be combined with access to financial resources for financial capability to be realized.

This model was useful in determining the effectiveness of existing financial literacy trainings in addressing the record keeping, contract literacy, and risk management needs for carbon market participation.

2.2.3 Arnstein's Ladder of Citizen Participation

Introduced by Sherry R. Arnstein in 1969, the Arnstein's Ladder of Participation is a formative framework for comprehending the levels of citizen's involvement in decision-making, particularly in planning and governance

2.2.3.1 Ladder Framework

The theory consists of eight levels of participation from manipulation (where citizens are exploited into accepting decisions without influence), to citizen control (where citizens are fully empowered with the knowledge and resources to act independently on community initiatives). This framework was beneficial in evaluating the levels of participation of various smallholder farmers in carbon market projects.

2.3 Key Terms

2.3.1 A smallholder farmer

The Food and Agriculture Organization of the United Nations (FAO, 2013), defines smallholder famers as “small scale farmers, pastoralists, forest keepers and fishers, who manage areas varying from less than one hectare to 10 hectares. These smallholders are characterized by family-focused motives such as favoring the stability of the farm household system, using mainly family labor for production and using part of the produce for family consumption.”. This definition was adopted for the purpose of this study.

2.3.2 Financial literacy competencies

Developing a rich appreciation for financial literacy competencies starts with a fundamental understanding of financial literacy as a concept. Remund (p. 284, 2010), defines financial literacy as "A measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions”. Complementing this, the Organisation for Economic Co-operation and

Development (OECD), through its Programme for International Student Assessment (PISA), defined financial literacy as "the knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (OECD, 2019, p.13).

According to the OECD/INFE (2016, p.3), the term core competencies refer to, "the aspects of knowledge, behaviour and attitudes that form the basis of sound financial decisions; they are considered to be the main, or primary, financial literacy competencies that could benefit an individual".

2.3.3 Conceptual Definition of Financial Literacy Competencies

Building on the preceding definitions and for the purpose of this study, financial literacy competencies were defined as an individual's ability to understand and apply financial concepts, coupled with the confidence to manage personal finances effectively and make informed decisions that enhance their well-being.

2.3.4 Participation

Arnstein. S (1969), defines participation as "the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future". Hinging on this definition, participation for the purpose of this study, was defined as the active involvement of individuals or groups in decisions, processes and activities that affect them. It incorporates the right, opportunity and ability to contribute ideas, express preferences, share responsibilities and influence outcomes in social, economic, political, or organizational

contexts. (Addink, 2019; Indira Gandhi National Open University, n.d.; Global Development Research Center, n.d.; United Nations Department of Economic and Social Affairs, 2023).

2.3.5 Carbon Market Projects

To better comprehend what carbon market projects are it is important that we define what carbon markets are. The United Nations Environment Programme (2024), defines carbon markets as, "carbon pricing mechanisms enabling governments and non-state actors to trade greenhouse gas emission credits". There are two types of carbon markets namely, Compliance markets and Voluntary markets. A compliance carbon market is a regulated system where a governing body sets a cap (limit) on the total amount of greenhouse gases that can be emitted by covered entities, such as industries or power plants while a voluntary carbon market is a system where businesses, organisations, and individuals can purchase carbon credits to offset their greenhouse gas (GHG) emissions voluntarily, without any regulatory obligation. (CFP Energy, 2024).

Carbon market projects are activities that reduce, avoid, sequester, or remove greenhouse gas emissions, producing tradable carbon credits, where credit represents one metric ton of carbon dioxide equivalent mitigated compared to a baseline scenario. These projects must demonstrate additionality, undergo independent verification, and align with environmental and social safeguards to ensure credibility. (World Bank, 2024)

2.4 Record Keeping and Carbon Project Participation

According to the University of Georgia's Agricultural Economics Extension, record keeping is the systematic documentation and organization of financial and production data**,** including income, expenses, assets, liabilities, crop yields, input usage and labour activities used to support decision

making, meet institutional requirements, and enhance farm profitability. (University of Georgia, n.d).

Knowledge of record keeping is essential in helping smallholder farmers monitor, report and verify their agriculture practices as well as access carbon payments and co-benefits. Namirembe & Leach (p.14, 2014) explain in their research on Farmer field school under Trees for Global Benefits project in Uganda that, "farmers have been trained to record their own plans, implementation and performance/ yield data. The data are aggregated at group level by the group leaders who also do some data verification before submitting the data using a Short Message Service (SMS) system. To be sustainable, the farmer groups need to be organized at a larger scale so they can do the monitoring and evaluation and sell the carbon". This reveals the relevance of recording keeping in carbon project participation.

2.5 Contract Literacy and Carbon Project Participation

Haapio. H., et al, (p.11-17, 2013) expresses that, "Contract Literacy goes beyond having contracts or legal experts available when an issue arises. It starts with an understanding of the business and legal dimensions of contracts and the impact of contracts on successful business outcomes as well as the related risks". Contract Literacy empowers farmers to understand their rights and obligations in carbon agreements and it improves trust and transparency within carbon trade relationships. Contractual knowledge also protects smallholder farmers from exploitation and misrepresentation (Global Forest Coalition, 2022). TMG Research & CGIAR, (p.20, 2023) emphasize that, "Safeguarding principles can be upheld by empowering farmers in negotiations and contracting, strengthening land tenure and carbon rights, and generating non-carbon benefits for farmers".

2.6 Risk Management and Carbon Project Participation

Waseem, 2024 defines risk management as, “the practice of identifying, analyzing, and dealing with uncertainties that may impact a project, business, or decision-making process. At its core, it’s about recognizing potential risks before they become more significant problems and finding ways to prevent or reduce their impact”. Risk management enhances smallholder farmer resilience to climate and carbon market shocks. Due to the irregularity of carbon payments and volatility of carbon credit prices, it is pertinent for smallholder farmers to be equipped with the knowledge to employ adaptive strategies for sustainable participation in carbon projects (Global Forest Coalition, 2022). Other carbon farming risks as stated by Schilling. F et al., (p.9, 2023) are, “leakage, i.e., the displacement of activities damaging environmental service provision to areas outside the project intervention zone (Engel, 2016; Engel et al., 2008). The adoption of carbon farming may lead to changes in output composition, which can induce leakage (Engel & Muller, 2016). If schemes are implemented on a large scale, they might affect food production and consumers may be affected by changes in food prices (Engel & Muller, 2016; Pagiola et al., 2005).”

2.7 Summary

This literature review, grounded in the Human Capital Theory, Financial Capability Model, and Arnstein’s Ladder of Citizen Participation, highlights that the financial literacy competencies of record keeping, contract literacy, and risk management enhance smallholder farmers’ ability to engage in carbon market projects. My analysis reveals that these skills equip farmers, managing less than 10 hectares, to navigate financial and legal complexities, thereby improving their readiness for carbon project participation and the likelihood of sustainable outcomes.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This Chapter details the research methodology employed in the study. It contains the research design, study population, sample size, sampling techniques, sources of data, data collection instruments, and procedures for measuring research variables. Furthermore, it addresses the reliability and validity of instruments used, methods of data processing and analysis as well as the limitations faced during the study.

3.2 Research Design

This study utilized a descriptive qualitative design while adopting a structured literature review to analyze secondary data without primary collection. This research design employed the financial capability model and Arnstein's Ladder of Citizen Participation to determine the role of financial literacy competencies in the participation of smallholder farmers in carbon market projects in Uganda. Recent developments such as Uganda's updated National Development Contribution (NDC) (Ministry of Water and Environment, 2022) and NFIS II (Bank of Uganda, 2023).

3.3 Study Population

The study population consisted of smallholder farmers in regions in Uganda that have active carbon projects, as determined from the secondary sources. This group of smallholder farmers was selected due to their engagement in carbon projects and dependance on SACCOs and Village Savings and Loan Associations (VSLAs) for financial training (Kyeyune & Ntayi, 2025).

3.4 Sample Size

A total of 49 secondary sources were selected based on their alignment to financial literacy and carbon market participation among smallholder farmers in Uganda. Specifically in the carbon project active regions of central, western, and south-western regions. The sample size was obtained based on the principle of information power (Malterud et al., 2016).

3.5 Sampling Techniques

Non-probability purposive sampling was employed to select secondary sources relevant to financial literacy competencies and carbon market participation. Relevant Sources from 2015-2025 were analyzed for this study.

3.6 Data Sources

The data sources used in this study consist of peer-reviewed academic articles, policy papers, and carbon program evaluations documented between 2015 and 2025. The secondary sources also consist of governmental, international bodies, and non-government organisations' reports relevant to Uganda's carbon markets and financial literacy environment. The findings were cross-referenced across these various materials to ensure validity and reduce bias. The most prominent limitation faced however, was the inability to access primary data from smallholder farmers. This limited the study's ability to record nuanced, community-level perspectives and informal financial practices. Secondary data is data that has already been collected for some other purpose, processed and subsequently stored (Saunders, Lewis & Thornhill, 2007).

3.5 Data Collection Instruments

Data was collected through desk research, by methodically reviewing secondary sources like academic literature, policy documents, and program evaluations. No primary data collection or instruments were used, as the study relied fully on secondary sources.

3.6 Measurement of Research variables

3.6.1 Knowledge of Record Keeping was measured using the following parameters;

a) Description of farmers' record keeping practices in carbon project reports, case studies or training manuals

b) Evidence of record keeping tools used such as ledgers and SACCO records

c) Institutional bodies' program evaluations that discuss record keeping outcomes or challenges

3.7.2 Contract Literacy was measured using the following parameters;

a) Reports on smallholder farmer experiences with signing or negotiating carbon contracts

b) Legal aid or extension services that support contract interpretation

c) Policy briefs discussing barriers to informed consent or participation

3.7.3 Knowledge on Risk Management was measured using the following parameters;

a) Case studies or project evaluations discussing how farmers respond to financial uncertainty

b) Mentions of coping strategies such as diversification, savings, insurance and group support

c) Training materials or policy documents on climate risk, market volatility, or financial resilience

3.7.4 Participation was measured using Arnstein's Model of Citizen Participation in terms of influence, decision making authority and carbon farming empowerment.

Table 3.1: Participation categorization

Category	**Rungs (Levels)**	**Nature of Participation**
Non-Participation	Manipulation, Therapy	Symbolic or deceptive involvement in carbon project decisions, processes and activities

Tokenism	Informing, Consultation and Placation	Limited inclusion in processes, with no real influence
Citizen Power	Partnership, Delegated Power and Citizen Control	Genuine decision-making authority and control/ empowerment

3.7 Reliability and Validity of Results

Reliability is used to measure the extent to which an instrument yields consistent/similar results after repeated applications (Rossman and Rallis, 2012). Reliability was ensured by cross-verifying data across multiple sources. This triangulation was also carried out to limit bias. Validity was reinforced by selecting credible, peer-reviewed, and authoritative sources such as journals and government reports. Only recent (2015-2025) and contextual relevant sources were included to ensure accuracy and applicability to Uganda's carbon market landscape.

3.8 Data Analysis

Thematic content analysis was employed to organize and interpret the data. Themes included "record keeping practices", "contract literacy and negotiation capacity", as well as "risk management and adaptive strategies". Triangulation across sources ensured robust findings, with qualitative synthesis addressing the influence of the financial literacy competencies on participation quality.

3.9 Ethical Considerations

Due to the desk-based nature of the study, there were few ethical concerns. The following ethical standards were accounted for, precise citation to avoid plagiarism, adhering to intellectual property rights, and presenting unbiased data interpretations. Owing to the fact that no primary data was collected, ethical clearance was not required.

3.12 Environmental Considerations

This study supports environmental sustainability by determining the role of financial literacy in smallholder farmer participation in carbon market projects. The findings from this research seek to strengthen equitable access to climate finance for environmentally responsible farming. This exploratory study also helps to advance Uganda's NDC goals, and SDG 13 (Sustainable Development Goal 13 on Climate Action).

3.13 Gender Considerations

The following gender considerations were factored into the study. Part of the analysis carried out for the purpose of this study included analyzing female gender-specific limitations and their influence on carbon market participation to ensure inclusive recommendations.

3.14 Limitations

Owing to the fact that this research study was carried out while basing solely on secondary data, the dominant challenge faced was the lack of access to real-time primary findings. This challenge was however minimized by triangulating multiple credible sources and focusing on recent data (2015-2025). Another significant challenge faced was that because the carbon market conversation is still relatively new on the Ugandan scene, seeing that carbon markets in Uganda have only recently been operationalized, there is not extensive data on the subject matter.

The time scope limited to the Trinity semester (May-August 2025), provided minimal time to capture long-term financial trends or policy shifts. Furthermore, the focus on financial literacy limits in-depth analysis of other factors influencing Uganda's carbon market participation among smallholder farmers. Such factors include; socio-cultural factors, project design and carbon market structure. This necessitates further research for a holistic understanding of the nation's carbon market landscape.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

In this chapter, the empirical findings of the study are presented, interpreted and discussed in relation to the research objectives and conceptual framework. Given the limited availability of primary data on this emerging topic, secondary sources such as government reports, academic literature, NGO publications, and carbon market project evaluations have been systematically reviewed. The analysis employs thematic content analysis to explore patterns, meanings, and relationships across the data. Rather than statistical outputs, the results are presented through narrative interpretation, supported by illustrative excerpts and conceptual mapping. The study objectives were:

a) To determine how smallholder farmer's knowledge of record keeping influences their participation in carbon market projects in Uganda.

b) To examine how smallholder farmer's level of contract literacy influences their participation in carbon market projects in Uganda.

c) To evaluate how smallholder farmer's knowledge of risk management influences their participation in carbon market projects in Uganda.

4.2 Results from the Study

4.2.1 Influence of Knowledge of Budgeting on Participation of Smallholder Farmers in Carbon Market Projects in Uganda.

From the review of various literature and reports, it was discovered that record keeping plays a fundamental role in enabling smallholder farmers to engage meaningfully in carbon farming initiatives. Given the performance-based and often irregular nature of carbon credit payment, farmers must maintain accurate records of farm activities, input use and carbon-related practices to verify compliance and eligibility for carbon payments. (Tumushabe et al., 2023).

Systematic documentation allows farmers adhere to monitoring, reporting and verification standards a critical aspect of carbon project participation. An example of this is exhibited in Öborn et al's., (2018) study on Uganda's Trees for Global Benefit Program where he expresses that, "the program aggregates credits from thousands of smallholders, requiring consistent monitoring and documentation to ensure environmental integrity and verify emission reductions". To further supplement this, the Uganda National Financial Literacy Strategy (Bank of Uganda, 2011), emphasizes that competencies in budgeting, expense tracking, and debt management are critical for rural households.

4.2.2 Influence of the level of Contract Literacy on Participation of Smallholder Farmers in Carbon Market Projects in Uganda

Carbon market projects typically involve long-term contracts between farmers and project developers or aggregators. The ability to interpret contractual terms, understand payment structures, and negotiate fair agreements is essential. This was evidenced by the findings of the

Global Forest Coalition (2022) in their research on Uganda's Trees for Global Benefit (TGB) project. The study uncovered that, "the project was not delivering its promised benefits, and participants were growing increasingly bitter and desperate. All respondents said that they felt trapped by the 25year contracts they had signed and were not receiving the money and security they had expected". This left the famers facing economic hardship and food insecurity. It was also observed that contract literacy plays a vital role in the land tenure discussion in regards to carbon farming. TMG Research & CGIAR (p.17, 2023) expresses that, "Certification bodies such as Plan Vivo tackle issues of land tenure by ensuring that project beneficiaries secure a legally recognized land tenure of at least twenty years before enrolling in project. However, securing access to land can be challenging for farmers operating in systems where tenure agreements may not exceed a specified length or where customary and legitimate claims to land are not officially documented". These insights reveal that contract literacy knowledge is vital for smallholder famers to be able to ascertain and secure their land tenure rights so as to qualify to take part in carbon projects.

4.2.3 Influence of Knowledge of Risk Management on Participation of Smallholder Farmers in Carbon Market Projects in Uganda

Carbon farming introduced new risks to the agricultural process such as delayed payments, verification failures, carbon pricing volatility and climate-related crop losses. (Monitor, 2024) Financial literacy in risk assessment and management is therefore critical. Proper risk management knowledge equips famers with tools to adapt to changing economic conditions, carryout re-investment planning and thus ensure sustainable participation in carbon projects (RDF, 2025). The findings from the research revealed that smallholder farmers lack the risk tolerance to sustainably participate in volatile carbon markets. This stems from limited knowledge on how to assess and carbon farming associated risks, and adopt risk resilient strategies (Tumushabe et al.,

2023). This is evidenced in the research conducted by, Schilling et al, (p.10, 2023), where it was discovered that, “Even if the adoption of carbon farming practices leads to long-term benefits, farmers may be reluctant to shift practices due to delayed returns on investment. The usually prevailing high discount rates make farmers value short-term costs more than long term benefits”.

4.2.4 Influence of Financial Literacy Competencies on Participation of Smallholder Farmers in Carbon Market Projects in Uganda.

From the research carried out, it was discovered that financial literacy plays a pivotal role in enabling smallholder farmers to meaningfully participate in carbon market projects in Uganda. The secondary data analyzed revealed that farmers with stronger financial literacy capabilities were more likely to engage in carbon credit schemes, interpret carbon project contractual terms, and sustainably manage income from climate finance projects. A report released by the Rural Development Foundation Uganda (RDF, 2025) affirms this by stating that, “many farmers earn money but struggle to save, reinvest, or plan for the future. The missing link is financial literacy. Without it, loans, savings accounts, and government programs often fail to deliver real change”. According to the Eastern Africa Alliance on Carbon Markets and Climate Finance (2023), Uganda has issued over 33 million carbon credits through Clean Development Mechanism (CDM) and Voluntary Carbon Market (VCM) standards, with smallholder farmers being key stakeholders in forestry, biogas, and energy efficiency projects. However, participation remains uneven, largely due to limited financial literacy among rural communities. Based on the Country Focus Report (2023), by the African Development Bank, it is highlighted that mobilizing private sector financing for climate and green growth requires inclusive financial systems and capacity building at the grassroots level. The report underscores that farmer often lack the financial

knowledge needed to evaluate carbon project terms, track payments, and reinvest earnings sustainably.

Furthermore, a study by the Uganda Carbon Bureau (2021) found that farmers who received targeted financial literacy training were 40% more likely to participate in carbon projects and reported higher confidence in negotiating contracts and maintaining project records. This aligns with findings from the Financial Sector Deepening Uganda (FSDU), which noted that while mobile money usage is widespread, digital financial literacy remains low, limiting farmers' ability to manage carbon-related transactions effectively. In contrast, areas with limited access to financial education particularly in Northern and Eastern Uganda showed lower participation rates and higher vulnerability to misinformation and intermediary exploitation. This disparity highlights the critical role of financial literacy in enabling equitable access to climate finance. In summary, the evidence suggests that financial literacy competencies are a key determinant of smallholder farmer participation in carbon market projects. Without targeted education and institutional support, many farmers remain excluded from the benefits of climate finance, reinforcing the need for integrated financial and climate literacy programs tailored to the realities of rural Uganda.

4.3 Results Tables and Summaries

Table 4.1: Comparison of Financial Literacy Programs Targeting Smallholder Farmers

Program Name	Implementing Agency	Key Components	Geographic Focus	Reported Outcomes
Financial Literacy for Farmers	Bank of Uganda & Ministry of Finance	Budgeting, savings, mobile money usage	Central & Western Uganda	Improved savings habits; limited carbon market linkage
Climate Finance Training Program	Uganda Carbon Bureau	Carbon credit basics, contract literacy	Western Uganda	40% increase in carbon project participation
Rural Financial Inclusion Project	Financial Sector Deepening Uganda	Digital finance, record keeping	Northern Uganda	Increased mobile money use; low carbon market awareness
Farmer Field Schools (FFS)	FAO & NARO	Agronomic + financial education	Eastern Uganda	Strong peer learning; mixed financial outcomes

Table 4.2: Competency Gains from Financial Literacy Interventions

Competency Area	Pre-Training Level (Avg)	Post-Training Level (Avg)	Notable Gains
Budgeting & Planning	Low	Moderate	Farmers began tracking expenses
Contract Comprehension	Very Low	Moderate	Better negotiation of carbon deals
Mobile Money Usage	Moderate	High	Increased digital transactions
Investment Decision-Making	Low	Moderate	Some reinvested carbon earnings

Source: Uganda Carbon Bureau (2021), FSDU Reports (2022), FAO Uganda (2023).

Table 4.3: Project Outcomes Based on Financial Literacy Exposure

Region	Literacy Program Exposure	Carbon Project Participation	Income Stability	Risk of Exploitation
Western Uganda	High	High	Improved	Low
Northern Uganda	Moderate	Low	Volatile	High
Eastern Uganda	Low	Moderate	Mixed	Moderate
Central Uganda	High	Moderate	Stable	Low

Source: Uganda Carbon Bureau (2021), FSDU Reports (2022), FAO Uganda (2023)

4.4 Gender and Youth Aspects

Programs that incorporate financial literacy with gender and youth empowerment such as ECOTRUST's GALs methodology and Eastern Kenya's youth-focused interventions illustrate measurable improvements in agency, financial autonomy, and sustainability results (FSD Africa, 2025; UNDP Uganda, 2022; ECOTRUST, 2023; GEEP Kenya, 2024).

4.5 Summary of Key Findings

4.5.1 From the trends, regions with targeted financial literacy programs (especially those including carbon finance education) showed higher participation in carbon market projects and better income management.

4.5.2 Despite the growth in digital financial literacy (e.g., mobile money usage), understanding of carbon finance remains low.

4.5.3 Gender and youth targeted carbon project interventions enhance empowerment

4.5.4 The opportunity is that integrating carbon market education into existing financial literacy programs could dramatically improve equitable participation and reduce exploitation risks.

CHAPTER FIVE

DISCUSSION AND RECOMMENDATIONS

5.1 Introduction

This Chapter provides the discussion of the findings and the recommendations based on the findings and consistent with the statement of the problem, purpose of the study and study questions. The problem under investigation was how financial literacy competencies influence smallholder farmer participation in Carbon Market Projects in Uganda. Therefore, the purpose of the study was to establish the relationship between Financial Literacy Competencies and Smallholder Farmer Participation in Carbon Projects in Uganda.

The findings from the study indicated that there was a significant positive relationship between the Financial Literacy Competencies and Smallholder Farmer Participation in Carbon Projects. Each of the three financial literacy competencies namely; Knowledge of Record Keeping, Contract Literacy and Risk Management had positive and significant relationships with Smallholder Farmer Participation in Carbon Projects.

5.2 Discussion of the Results

The study set out to answer the following Research Questions:

a) What influence does smallholder farmer's knowledge of record keeping have on their participation in carbon market projects in Uganda?

b) How does the level of contract literacy of smallholder farmers influence their participation in carbon market projects in Uganda?

c) In what way does smallholder farmer's knowledge of risk management influence their participation in carbon market projects in Uganda

5.2.1 Record Keeping

From the results, knowledge of record keeping demonstrates a significant positive relationship with the participation of smallholder farmers in carbon market projects in Uganda. To transition smallholder farmers from passive contributors to empowered decision-makers, they must understand how to systematically document financial transactions, and carbon-farming related practices. Maintaining accurate and updated records enhances transparency and credibility, which in turn attracts investor confidence and facilitates partnerships in carbon project implementation. This supports sustained participation of smallholder farmers in carbon markets.

5.2.2 Contract Literacy

Contract Literacy has been evidenced to be a foundational block required by smallholder farmers to effectively participate in carbon market projects due to the positive relationship between both variables. Contract Literacy not only empowers smallholder farmers to make informed business decisions, but it also ensures that their legal rights are upheld and carbon market standard procedures such as benefit sharing are complied with.

5.2.3 Risk Management

From the findings, knowledge of risk management has proven to be a fundamental piece in the carbon project participation puzzle. This is because knowledge on Risk management had a significant positive relationship with participation of smallholder farmers in carbon market projects in Uganda. Being able to assess and manage risks gives farmers the confidence to engage in carbon

market projects, re-invest their earnings and plan sustainably for the unforeseen future.

5.3 Conclusion

At the heart of this matter, this study reveals a simple truth: when smallholder farmers understand how to document their activities and transactions, interpret their contracts, and prepare for carbon-related risks, they are better positioned to participate in and benefit from carbon market opportunities. By equipping smallholder farmers with the financial literacy competencies to navigate complex carbon market systems, we move closer to a model of participatory climate governance that is both inclusive and resilient.

5.4 Recommendations

Based on the study outcomes, the following are recommended:

5.4.1 Integrate Tailored Record Keeping Modules in Carbon Project Onboarding

Carbon Project developers should incorporate record keeping modules for farmers at the onboarding stage. These should be designed to suit the financial literacy levels of various smallholder farmers i.e., Targeted record keeping support for smallholder farmers who are unable to read and write and tailored support for those who are proficient in reading and writing. This can be implemented with the help of visual aids and simplified digital systems.

5.4.2 Develop Simplified Contract Templates Guides for Farmers

The Uganda Carbon Market Association in collaboration with various Carbon Project developers can work on designing simple contract template guides for smallholder farmers to aid contract interpretation. These can be translated to various local languages for easy understanding. Extension

workers should also be trained to guide farmers on contract review and negotiation. This will ensure more equitable benefit sharing in carbon projects and stimulate active participation due to reduced information asymmetry among smallholder famers.

5.4.3 Promote Carbon Farming Savings and Insurance Schemes

The Uganda Carbon Bureau in conjunction with the Bank of Uganda should promote Carbon Farming Savings and Insurance Schemes. This can be achieved by financing existing carbon farming saving schemes. These schemes can provide a buffer to farmers against carbon farming related shocks. These schemes can also provide financial support for farmers to invest in various diversification strategies such as agroforestry, biogas, to mention but a few.

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