

**PROJECT MANAGEMENT PRACTICES AND PERFORMANCE OF TISSUE
CULTURE BANANA PROJECT: A CASE OF NATIONAL AGRICULTURAL
RURAL INCLUSIVE GROWTH PROJECT IN HAMISI SUB-COUNTY, VIHIGA
COUNTY, KENYA**

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**A Research Project Submitted in Partial Fulfillment of the Requirements for the
Award of degree of Master of Arts in Project Planning and Management,
University of Nairobi**

2022

DECLARATION

This report is my original work and has not been submitted to any institution for any academic award.

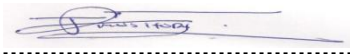
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DEDICATION

I hereby dedicate this research project to my parent Mrs Mavitiru, my two sons Vardy, Reeds and daughter Zamyra. I appreciate their understanding and support they offered to me throughout the research. I will always be grateful.

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ABBREVIATIONS AND ACRONYMS

CBOs	Community Based Organizations
CDF	Constituency Development Fund
DV	Dependent Variable
ESP	Economic Stimulus Program
FAO	Food and Agriculture organization
GDP	Gross Domestic Product
GLS	Generalized Least Squares
GOK	Government of Kenya
ICT	Information Communication and Technology
IFAD	International Fund for Agricultural Development
IV	Independent Variable
KOSFIP	Kimira – Oluch Smallholder Farm Improvement Project
M & E	Monitoring and Evaluation
NACOSTI	National Commission for Science, Technology and Innovation
NALEP	National Agriculture and Livestock Extension Programme
NARIGP	National Agricultural Rural Inclusive Growth Project
SPSS	Statistical Package for Social Sciences
TC	Tissue Culture
TOC	Theory of Constraints

ABSTRACT

The National Agricultural and Rural Inclusive Project is instrumental in inculcating new technology in farming and making Vihiga farmers move from the traditional subsistence tissue culture banana farming to agribusiness. The purpose of the study was to determine the influence of project management practices on performances of tissue banana of national agricultural rural inclusive growth project in Hamisi Sub County, Vihiga County, Kenya. The study objectives were; one, assess the influence of project planning, capacity building, project implementation, monitoring and evaluation and to evaluate the combined influence of project management practices on performance of tissue culture banana in Hamisi Sub-County. The study was guided by project management competency theory, theory of constraints and resource based view theory. The study adopted descriptive survey research design and correlational research design. The study target population was 296 tissue culture banana beneficiaries and 12 officials involved in the project. The study utilized Stratified simple sampling technique to acquire 170 respondents that make up the sample size of this study. The study employed a structured questionnaire as the primary tool for data collection. Data analysis was conducted using SPSS version 23.0. Descriptive statistics employed included the using mean and standard deviation to measure central tendency and dispersion and respectively. Thematic analysis applied to analyze qualitative data. The inferential statistics involved analysis using correlation analysis, simple and multiple linear regression. Simple and multiple regression models were used to test null hypotheses at a significance level of 0.05, and the results for the four hypotheses indicated that were all rejected. The results were: the first hypothesis, showed $R=0.764$, $R^2=0.583$, $\beta=0.816$, $t=14.053$, $F_{(1,141)}=197.5$ and $p=0.000<0.05$; second hypothesis, $R=0.776$, $R^2=0.602$, $\beta=0.815$, $t=14.589$, $F_{(1,141)}=212.831$ and $p=0.000<0.05$; third hypothesis, $R=0.812$, $R^2=0.659$, $\beta=0.856$, $t=16.526$, $F_{(1,141)}=273.093$ and $p=0.000<0.05$; fourth hypothesis, $R=0.783$, $R^2=0.613$, $\beta=0.756$, $t=14.944$, $F_{(1,141)}=223.334$ and $p=0.000<0.05$; fifth hypothesis, in overall combined effect; $R=0.880$, $R^2=0.774$, $F_{(4,138)}=118.474$; project planning ($\beta_1=0.202$), capacity building ($\beta_2=0.251$), project implementation ($\beta_3=0.296$) and M&E ($\beta_4=0.236$). The study concludes that project planning is an essential component in improving the performance of tissue culture banana project and capacity building improves the performance of banana tissue culture through provision of training on budgets which help farmers prepare. Project implementation contributes to the success of the tissue culture banana project by helping farmers properly employ farm inputs appropriately while monitoring and evaluation is also a critical tool that determines the performance of tissue culture banana project. The study also concludes that project management practices play significant role in promoting the performance tissue culture banana projects. Agricultural extension officers to help culture banana farmers how to create viable plan that will guide them in planting and managing for the tissue culture banana by outlining the necessary farm input and procedures of tissue culture farming. The study recommendation includes recruiting and training extension officers to enable availability of extension services to all farmers, collaborating with the county government ministry of agriculture so that they provide financial support or provide seedlings to farmers. Collaborate with the county government ministry of agriculture so that they provide financial support or provide seedlings to farmers. Similar study be carried out in other counties to determine how Rural Inclusive Growth Project management practices have impacted agricultural productivity in rural settings with particular focus to banana farming.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Economic development highly depends on agriculture. It contributed 4% to the worldwide gross domestic product (GDP) in 2018, and in some developing nations, it can reach more than 25% of GDP (World Bank, 2020). In addition, it is the principal driver of employment and a significant portion of exports and foreign exchange in the majority of emerging nations (Byerlee, Xinshen, & Chris, 2015). In developing nations, agriculture remain as key income source for those residing in rural areas. The rural poor frequently require investment and working capital to increase productivity or diversify their sources of income. Tissue culture bananas are a key scientific breakthrough commonly regarded as a practice of trying to solve food productivity, food scarcity, and food accessibility and affordability for numerous households, whereby surpluses are taken to the market to provide much-needed money to countless peasant farmers throughout the world (Chandler 2005).

After rice (*Oryza sativa*), milk and wheat (*Triticum aestivum*), bananas (*Musa* spp.) are the fourth most important food security commodity for many households worldwide (Guimar Maia, & Coelho, 2014). Bananas are members of the Musaceae family of the genus *Musa*. The modern banana is a hybrid of two wild banana species, *Musa acuminata* and *Musa balbisiana*. Banana production had increased to 74 million metric tons (Mt) per year by 1991. This quantity had nearly tripled to 201 million metric tons per year by 2013 (FAO UN, 2014). Bananas are now the most widely farmed fruit crop in the world, with 140 countries growing them.

Indian government has taken various actions to end extreme poverty and hunger by allocating resources to important areas including infrastructure, agriculture, health, and education. It has been discovered that agricultural biotechnology can enhance production and incomes in underdeveloped nations (Jain, 2016). Tissue Culture (TC) banana technology is one of the biotechnologies. Bananas may be planted in large quantities using the tissue culture process, which creates plants in sterile conditions from roots, leaves, or stems. Utilizing this innovation

results in planting materials free of disease, which helps to boost yields and shorten the time it takes for a crop to mature.

For millions of people in Africa, bananas are a key staple food crop. Since bananas are produced all year round, they serve as a crucial source of food when there is a food shortage (Muyanga & Jayne, 2019). Inspire of the majority of African nations having not adopted modern biotechnology in their production, bananas are therefore essential to the security of food in Africa (Veneman, 2013). Africa's banana industry faces obstacles like low productivity in farm, inadequate agricultural inputs, shrinking sizes of the farm, and a lack of use of necessary techniques (Mbabu & Ochieng, 2016).

To reduce household food insecurity in areas where bananas are grown, tissue culture has been used in Kenya on the banana crop. The smallholder banana producers in Kenya have adopted it widely. In Kenya, significant products including coffee, maize, and tea are also grown, including bananas (Bandewar, Wambugu, Richardson & Lavery, 2017). Tissue-cultured banana technology was first deployed in Kenya in 1997 in the central and upper eastern districts to combat diminishing banana yields due to pests and diseases. Tissue culture bananas are produced in large quantities in these two places. The technique has yet to be widely adopted in the lower eastern region (Wahome, Maingi, Ombori, Kimiti & Njeru, 2021). The latter places are also closer to sources of certified planting materials, such as tissue culture (TC) banana plantlets, which have been explored. These sources include the Kenya Agriculture Research Livestock Organization's Thika, Embu, and Katumani research stations, as well as universities like as Jomo Kenyatta University of Agriculture and Technology, South Eastern Kenya University and University of Nairobi, among others.

In Hamisi Sub County, numerous small-scale farmers have less than one acre of land, but they use it exclusively for banana cultivation. The year-round food and financial stability of banana growers is aided by the consistent availability of harvestable bunches of bananas (Bandewar, Wambugu, Richardson & Lavery, 2004). (2017.). The Sub County has adopted the Tissue Culture banana technique, however 70% of the farmers are taking their time implementing it (Nyang'au, 2019). With its acceptance, it was anticipated that the small-scale banana farmers' food insecurity and poverty would decrease and banana production would increase. The tissue culture grown in vihiga include: cooking typesN'gombe, NusuN'gombe, Solio, Ishighame and the

Ripening are grandnaine, giant Cavendish and Gold finger. The National Agricultural and Rural Inclusive Project (NARIGP) plays a crucial role in introducing new technologies to tissue culture banana cultivation and encouraging Vihiga banana producers to transition from old subsistence to agribusiness (Ndirangu, 2020). Enhance extension services for farmers to uplevel productivity while utilizing modern agricultural technologies through acquired vehicles and motorcycles.

1.1.1 Performance of Tissue Culture Banana Project

The derived benefits acquired from the new technology of the banana as a crop are numerous across the countries that have practiced this farming. According to Wahome, Maingi, Ombori, Kimiti and Njeru (2021) post that Banana tissue culture (TC) gives the chance to produce a substantial number of seedlings free from diseases. The cultivation of bananas using tissue culture technology is very effective because it enables on time rapid turnover of unsoiled planting materials in a constrained area. Tissue culture technology therefore has the ability to greatly increase yield. In this study, performance of Tissue Culture banana was examined through job creation, quality of farm produce and household income for the farmers involved in the NARIGP banana crop.

1.1.2 Project Management Practices

This entails application of techniques, approaches, skills, knowledge, and experience to complete particular project objective as per the project acceptance criteria while observing budget (Aaltola, 2017). Execution of practices of project management are subject to a limited time and money. The components of project management or simply put the practices involve project planning capacity building project implementation and project M and E, (Ocharo, & Kimutai, 2018). To enhance project performance, Tereso, Ribeiro, Fernandes, Loureiro and Ferreira (2019) posit that project management practices ought to begin by a proper planning for the budget timelines project team and also project management team and involvement of stakeholders. The following is a discussion of each of these components aiming at understanding how they significantly influence the field of project management.

1.1.2.1 Project Planning

Planning begins as soon as a potential project's need is determined and continues throughout the project's lifespan. The focus shifts from strategic planning to detailed planning to monitoring and

controlling the project using the plan. Action may be needed during project implementation to maintain the plan and to replan as needed (Allen, McLees, Richardson & Waterford, 2015). The elements of a project plan according to Klein (2017) include project scope time resources quality cost and supporting plans (risks communication and procurement). The major goal is to successfully manage risk during project execution by properly planning time, cost, and resources (Szopik-Depczynska & Lanfranchi, 2016).

1.1.2.2 Capacity Building

A successful project needs individuals with the vital expertise, knowledge, and availability to execute project and guarantee its long-term viability (Jugnarain & Beale, 2016). The process of enhancing the required resources, knowledge, processes and abilities required for project execution is known as capacity-building (United Nations, 2011). Building capacity entails improving people's knowledge and abilities as well as the supporting organizational structures and procedures required to carry out the project successfully over the long term (Jugnarain & Beale, 2016). Due to various long-term effects of capacity building, it is usually taken to be more crucial. Approaches to increasing capacity focused at reducing an over-dependence on outsourced expertise as information hub, materials source, and solutions for local projects. Building capacity encourages a sense of empowerment and ownership so that community partners have more influence over their own programs (Andrews & Motes, 2014). Additionally, capacity building is essential for success of NARIGP, as it pays handsomely than formal employment. Educating banana farmers on the best farming practices in the program aims to build capacity on new farming technologies to farmers.

For both nursery operators and farmers, switching from traditional suckers to tissue culture technique calls for distinct knowledge and skills. While agronomic and technical training is crucial for nursery operators, it is insufficient to run a profitable nursery; owners also need to be savvy in business and marketing. For farmers to fully profit from the promising increase in productivity and more consistent banana harvesting periods, they need to have strong business and marketing skills (Lule, Dubois, Coyne, Kisitu, Kamusiime & Bbemba, 2013).

1.1.2.3 Project Implementation

Project implementation or execution refers to performing the project's planned operations. The project implementation stage is where ideas and plans come to life (Al-Hajj, & Zraunig, 2018). This entails the logical outcome after evaluation, decision-making, planning, funding application, and identifying of a project's financial requirement. At this stage, the project manager organizes and manages resources to ensure set goals are attained. The project cycle's execution stage is by far the most crucial because it is at this phase that planned benefits are actually realized (Ocharo & Kimutai, 2018). Therefore, every level of the cycle functions as a support for the implementation stage. While assigning undertaking obligations to the assignment team in the organization, a task must be completed successfully (Njiru, 2018). The goal of a project execution practice is to implement the action plan, provide the outcomes, fulfill the intended purpose(s), and effectively contribute to the project's ultimate goal. It also aims to manage the available resources effectively and track and report progress (Igwe & Ude, 2018).

In the past, technology transfer was the main focus of extension program, with extension farmers utilizing people, groups, and mass media means to disseminate information from research stations to farmers. Extension has more recently been urged to take on prospects of “technological advancement” by connecting developers with community group requirements and assisting in the development of appropriate technologies. Different responsibilities are played by extension farmers in the execution of agricultural initiatives. Extension workers adopt a new attitude in which they see their job as assisting farmers and residents in the rural area in organizing themselves and taking control of their own growth as well as development. Extension farmers can assist the community, particularly the underprivileged or weaker segments, in organizing themselves for development by using community organizing concepts and group management abilities. Additionally, they support rural communities in bettering their planning, executing, and monitoring abilities as well as understanding their individual and collective management styles. Extension farmers also play the role of empowering farmers to solve their own problems (Chamala & Shingi, 2015).

1.1.2.4 Project Monitoring and Evaluation

According to Boulmetis and Dutwin (2014), monitoring and assessment serve different purposes. Monitoring entails a process which gives information to managers and guarantees that this information is being utilized to evaluate project outcomes and highlight their impact (Boulmetis & Dutwin, 2014). It also determines if the set goals or plan have been realized. It is a management tool that provides continuous feedback on the project's development by highlighting prospective advantages and limitations that could aid in making quick decisions. M & E assesses the physical and financial advancement of project or program activities in comparison to established timeframes and success indicators; it also assesses the mechanisms responsible for activity advancement or successful output generation. In order to gauge the impact of project activities, it also tracks the initial reactions and responses as well as the immediate short-term effects. Monitoring projects helps to ensure that everyone who needs to know about them is aware of them, reduces the likelihood of project failure, promotes methodical and expert management, and evaluates the implementation process (Boulmetis & Dutwin, 2014).

The M & E system's data and information are utilized in identifying patterns in the outcomes of a project and its impacts (Boulmetis & Dutwin, 2014). M and E in the context of a project's performance refers to a procedure that systematically and objectively assesses the relevance, effectiveness, sustainability, efficiency, and effect of operations, with an emphasis on the analysis of progress made toward the attainment of predetermined goals. Additionally, M & E assists with amending project policies, objectives, and strategies, resulting to a more improved designed programs, improved quality, and timely assessment of their impact. It determines the extent to which objectives have been achieved, identifies problems with program planning and implementation, generates data that enables cumulative learning, and helps with project evaluation. As a result, evaluation is a procedure that determines the viability of initiatives and supports resource commitment decisions. Mid-term (interim) evaluations, terminal or ex-post evaluations are all possibilities. M & E are among the two most crucial parts of assuring the success of numerous projects whenever they are undertaken as required at the right time and right location. The assessment's findings and recommendations are frequently used to determine whether or not the project should be stopped or if a new phase should be considered (Boulmetis & Dutwin, 2014).

1.2 Statement of the Problem

According to FAO (2019), the agricultural sector remain key to the growth of the economy as it plays a crucial part in agricultural production. FAO (2014) further posit that the sector contributed approximately 26 percent of the economy's GDP directly and about 27 percent of GDP indirectly through connections with other sectors. Because of this, the sector is regarded as the engine of the economy and income source for the majority of Kenyans. NARIGP donors injected massive resources in agricultural projects by starting projects, providing funding and technical assistance, and fostering the growth of marketplaces as a means of fostering community development. Farmers and similar groups in Vihiga County started tissue culture banana farming projects using the financial support provided by NARGIP and other non-governmental organizations as a means of ensuring food security and better incomes. However, because to the unreliability of tissue culture banana programs, the majority of these initiatives are only partially functioning or have failed, leaving the recipients hungry and in need of food (Rao, Midega, Atieno, Auma, Cadilhon, Mango & Wesonga, 2015).

According to Golini, Kalchschmidt and Landoni (2015), in the majority of developing nations, project management approaches are at 40% of total projects. One type of development initiative that struggles with sustainability is agriculture. According to an effect assessment report from a non-governmental organization operating in the county of Vihiga that provides financial assistance to farmers, just 35 percent of crop projects initiated by farmers in Vihiga are believed to be sustainable (Vihiga County, 2017). As noted by Gatonye (2017) over 35% of the donor funded projects in Kenya have recoded high failure rate over the years. According to World Bank (2016), most of the NAGRIP projects launched in Vihiga County in 2016 were to be complete by 2019. However, only a couple of these projects have been completed over more than a year since the elapse of the set timeline. The County Government has decried slow uptake of NARIGP funded activities in Vihiga County and challenged the beneficiaries to embrace best practices learned through various capacity building programmes, including educational tours and exhibitions (Aluda, 2021).

The existing evidence show conflicting literature on the role of project management practices in enhancing project performance. Kerzner, (2018) argued that the project management by the

World Bank had a genitive impact on project performance and speedy completion while Turner and Ledwith, (2018) contended that there lacked significant relationship between project and project performance and sustainability.

Locally, several studies have focused on project management practices (Fraz, Waris, Afzal, Jamil, Shah & Sultana, 2016: Simiyu 2018: Lumiti & Ainebyona 2019: Muiruri & Bett, 2020). Simiyu (2018) determined the impact of project management approaches on the success of agricultural projects in Bungoma county and found that factors like project planning and implementation had a substantial impact on project success. Lumiti and Ainebyona (2019) assessed how Kilifi County's food security projects performed as a result of project management techniques. Findings show that project management approaches had positive and substantial effects on performance of food security projects.

These studies, however, have shown meagre literature in regard to project management approach and agricultural performance. The contexts of these studies also were different from the current study with most of them focusing on other projects in the agricultural sector other than banana tissue culture. Moreover, performance of NAGRIP projects in Vihiga County has not been documented particularly in regard to project management practices. This research purposed therefore to bridge the gaps by evaluating the influence of project management practices on performance of tissue culture banana project: a case of national agricultural rural inclusive growth project (RIG) in Hamisi sub-county, Vihiga County, Kenya.

1.3 Purpose of the Study

The research purposed to determine the influence of project management practices on performance of tissue culture banana project, a case of national agricultural rural inclusive growth project in Hamisi sub-county, Vihiga County, Kenya.

1.4 Objectives of the Study

- i. To assess the influence of project planning on performance of tissue culture banana in Hamisi Sub-County.
- ii. To establish the influence of capacity building on performance of tissue culture banana in Hamisi Sub County.
- iii. To examine the influence of project implementation on performance of tissue culture banana in Hamisi Sub County.
- iv. To determine the influence of monitoring and evaluation on performance tissue culture banana in Hamisi Sub County.
- v. To evaluate the combined influence of project management practices on performance of tissue culture banana in Hamisi Sub-County.

1.5 Research Questions

- i. How does project planning influence performance of tissue culture banana in Hamisi Sub-County?
- ii. What is the influence of capacity building on performance of tissue culture banana in Hamisi Sub-County?
- iii. What is the influence of project implementation on performance of tissue culture banana in Hamisi Sub County?
- iv. How does monitoring and evaluation influence performance tissue culture banana in Hamisi Sub-County?
- v. What is the combined influence of project management practices on performance of tissue culture banana in Hamisi Sub-County?

1.6 Research Hypotheses

1. **H₀**: Project planning has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁Project planning has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

2. **H₀**: Capacity building has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁: Capacity building has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

3. **H₀**, Project implementation no has significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁, Project implementation has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

4. **H₀**, Monitoring and Evaluation has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁, Monitoring and Evaluation has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

5. **H₀**, Combined project management practices have no significant relationship with performance of tissue culture banana culture in Hamisi Sub-County.

H₁, Combined project management practices have a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

1.7 Significance of the Study

This research hopes to create more light on the need to improve on performance of projects initiated by the department of Agriculture in Vihiga County. This study might also provide sufficient empirical evidence on project management practices as much as NARGIP's tissue culture banana project is concerned in Hamisi Sub-County thus informing a policy head start. In addition, it might provide a pertinent reference material for the much-needed research-based empirical evidence in project management discipline.

The study might also be of use to the scholars building knowledge regarding the performance of tissue culture banana project and its relation to project management practices hence future scholars can use the information to act as theoretical basis for their studies. The study might also provide recommendations for further study which future researchers may adopt for their studies. The community might also find the study findings useful as they will understand how the project management practices affect the performance of tissue culture banana project hence adopt the recommendations for improvement. The ministry of agriculture in the county as well as in national government might be important in understanding the association between project management practices and performance of tissue culture banana project hence they will come up with policies that will lead to improved performance.

1.8 Delimitation of the Study

This research was specifically centred on capacity building, project planning, project implementation and M & E on performances of tissue culture banana NARIGP in Hamisi Sub County, Vihiga County, Kenya. This research focused on tissue culture banana as it is the most recent technology that is expected to bring out a huge difference in the agriculture sector and hence address the food security issue in the country. The researcher delimited the study to Vihiga County and specifically Hamisi Sub-County as the location is near to the researcher's residence hence data collection was easy to conduct.

1.9 Limitations of the Study

Respondents at a public sector are generally suspicious and some may have a thought that information shared may unearth unethical practices. To circumvent this, the researcher explained the importance research to all participants well in advance. The researcher also operated through the expansive government and county government structures. The study was also being carried out in an abnormal time when the world including Kenya has been hit by Covid-19 pandemic. As the containment measures such as keeping social distance continue being implemented, it was be difficult to have meetings with the respondents hence collecting the data required more favourable methods In this regard, the questionnaire distributed by dropping and picking later method where proper physical distancing was observed. The research assistants avoided one on one discussions with the respondents and also ensured that both the research assistants and the respondents wear masks always.

In order to collect comprehensive data, the researcher developed a detailed questionnaire to enable collection of sufficient data so that, notable conclusions can be made devoid of resource wastage. Besides, the researcher had field assistants in place for distributing and collecting questionnaires from the respondents in order to reduce time wastage and ensure effectiveness in the process of data collection.

1.10 Assumption of the Study

It was assumed that participants for the study would be cooperative, honest and factual in their responses to the information in the questionnaire and that they would return promptly the questionnaires filled with no external influence. It was also assumed that the study variables on project management practices are what the implementing CBOs have been engaging in, for instance, project planning, capacity building, project execution and monitoring and evaluation. Thus, the responses given would be informed by the knowledge of what is happening on the daily routine within the tissue culture banana project.

1.11 Definitions of Significant Terms

Capacity building: is defined as the impartation of skills and knowledge through practices such as refresher training skills, provision of technical assistance to the local CBOs so as to strengthen local networks and maximize productivity and opening room for marketing farm produce.

Monitoring and Evaluation: entails a process which determines the viability of programmes or projects and facilitates decisions on further financial monitoring, regular data collection and data dissemination.

Project implementation: Refers to undertaking the activities described in the project plan. In this study project implementation means such activities as assembling of planting materials crop management and work breakdown structure.

Project planning: Refers to such activities as feasibility study project extension services and financial resource planning where stakeholder engagement is involved for purposes of estimation of cost, resources and time estimates of work to be done and manages risks efficiently while executing the project. Project planning in this research is focused on stakeholder engagement, project extension activities and feasibility study.

Project performance: This refers to performance of Tissue Banana Culture of NARIGP in terms of jobs created, the quality of farm produce, the creation of individual household income and the overall beneficiary satisfaction.

1.12 Organizational of the Study

The research contain five chapters: the first chapter is introduction part and contains background, statement of the problem, objectives, hypotheses, justification, limitation and delimitation, definition of terms and finally structure of the study.

The second chapter is the literature review. In this second chapter, relevant literature is reviewed on performance of tissue culture NARIGP, capacity building and performance of NARIGP, project planning and performance of NARIGP, M & E and performance of NARIGP and performance of tissue culture banana of NARIGP. The theories that anchor the study are also

discussed. Further the conceptual framework as well as summary of literature review is presented in the chapter.

Chapter three covered the research design, targeted population, sample size and sampling technique, tools of gathering data, procedure of data collection, ethical considerations and operationalization of the variables of the study.

The fourth chapter captures data analysis, it presents findings as well as discussions. Fifth chapter entails a summary, conclusions and finally outlines recommendation for future studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter reviews literature as per the following study themes: Performance of Tissue Culture Banana; project planning and Performance of Tissue Culture Banana; capacity building and Performance of Tissue Culture Banana; project implementation and Performance of Tissue Culture Banana; and M and E and Performance of Tissue Culture Banana. The study also reviews theories that are relevant including the project management competency theory, theory of constraints and resource based view theory. The conceptual framework is provided with summary of literature and the research gaps.

2.2 Performance of National Agricultural Rural Inclusive Growth Project (Tissue Culture Banana)

Performance is a broad concept with a variety of measures in the context of project management. According to a body of literature, the satisfaction of stakeholders, scope, time, and cost dimensions can all be used to gauge a project's performance (Muller & Jugdev, 2012). A study was conducted by Kerzner (2018) to evaluate project management where scope was considered an important factor in measuring project success. The project's quality as it is being delivered is the main factor taken into account while evaluating the scope. Meng (2012) posit that the project's quality was another performance measure. Non-conformance reports can be considered while evaluating quality performance, particularly for ISO-certified businesses. The degree of client happiness can be taken into account while analyzing quality issues (Di-Maddaloni & Davis, 2017). Project performance makes sure that a company optimizes earnings while minimizing the risks and uncertainties associated with achieving the project's goals. Simiyu (2018) evaluated the effectiveness of agricultural projects using metrics such project goal achievement, budget compliance, product quantity, and product quality. To improve efficacy and conformance with quality performance at the project's conclusion, it is crucial to openly and plainly establish quality standards in the planning process.

Further study by Zairi (2012) showed that project performance may be gauged on basis of financial measures (household income) customer measures (customer satisfaction) and project

success measures (quality of the produce). As per Kikulwe, Kabunga and Qaim (2012) the findings indicated that uptake of banana tissue culture had a favorable impact on banana productivity and revenues. The technology boosts gross margins by about 100% and yield by 40–50%. As a result, the technology of banana tissue culture can greatly support rural development in Kenya's small agricultural sector.

Performance of payment solutions can be measured with regard to time (Kerzner, 2017). Project cycle and process cycle are the two different forms of cycle time. The start and finish of a project are determined by its life cycle. Cycle time is the amount of time needed to finish a job. Measures of cycle time depending on expected outcome. In other words, cycle times for projects of a similar sort is compared to establish a standard project life-cycle time (Kerzner, 2017). Gauging cycle times entails calculating how long it takes for any of processes that make up a project's life cycle to be completed. The investment returns to the company more quickly the shorter the cycle durations. Number of projects to be completed by an organization depends on duration of total cycle time for all projects.

The results concur with Mungania (2010) who studied impact of tissue culture Bananas on living standard of residents in Abogeta, Imenti and found that tissue culture Bananas has led to increased income because of sales of tissue culture Bananas and employment in the tissue culture Bananas farms. Banana farming is an income source for most of the residents. Ouko et al, (2020) studied impact of Covid-19 on food security and livelihood of people in Kenya found out that agriculture tend to be major source of livelihoods for most rural households. Furthermore, Khaled et al, (2010) in their study on banana-growing tissues and their effects on economic returns in Egypt discovered that bananas grown through tissue culture did better than those grown through traditional farming with an average profit from tissue cultured bananas reaching 591 percent. The findings support a Wittkop et al. (2009) study on the status and prospects of breeding for improved yield and high quality oilseed crops grown in Europe, which found that seed quality frequently correlates directly with a farmer's crop yield.

In Kisii Central, Obaga and Mwaura, (2018) did a study on the impact of farmers' involvement in banana value addition on household welfare and found that parents provide their kids' books for reading and writing and that the majority of respondents were self-employed whereas others were factory workers.

2.3 Project Planning and Performance of NARGIP Tissue Culture Banana

The process of project planning entails selection of project's goal, specification of the resources needed and their allocation, the choice of delivery methods, the handling of urgent situations, and the evaluation of activities and outcomes (Watt, 2014). The Planning stage's goal is to watch out on the project's task breakdown, resources, cost, and timeline. Naeem et al, (2018) investigated the outcome of project planning approach on success of a project. The research was carried out among several project-based private organizations in Pakistan. A questionnaire was issued to 120 managers of project so as to gather data. The findings of the regression and correlation approaches revealed that project success is positively and significantly related to project planning.

Regionally, Lemma (2014) in Ethiopia sought to evaluate the role played by project planning on performance of project. Data about past/completed/projects was gathered from 43 different organizations. To gather information from the project manager and supervisors, a questionnaire survey was undertaken. Correlation and regression analysis were employed in the research. Human, management, technological, and organizational elements are the key planning input components that impact planning processes performance, according to the research. In their study, Umulisa, Mbabazize, and Shukla (2015) evaluated how the Agaseke project in Kigali, Rwanda, performed as a result of the strategies used in project resource planning. A cross-sectional study was used as the research design and target group was 3,800 women who were participants in the programs. The research has a sample size of 120 participants. To collect primary quantitative data, a questionnaire was employed, and to acquire qualitative data, an FGD in-depth interview guide was used. Human resource planning, material resource planning, time and financial resource planning techniques all influenced performance of the Agaseke project, according to the findings. Christian and Nyambane (2021) used a causal research design to analyze impact of planning on project performance. The target demographic consisted of 145 Rwanda Utilities Regulatory Authority respondents and a sample size of 106 workers from whose data was obtained using a structured questionnaire. Descriptive approach as well as multiple regression was factored in to analyze the data and there was a favorable substantial linear association between planning and project performance, according to the findings.

Locally, Ngure (2013) investigated the factors influencing performance of agricultural projects, focusing on the NALEP project based in Ruiru. There were 41 NALEP initiatives in the target population and data analyzed descriptively. On 41 of the 59 NALEP experiments, the researcher employed a census survey. The sample size was 51 responders; all of them were project committee members, with one official per project filling out a questionnaire. The data was then quantitatively and qualitatively examined. According to the results, the performance of NALEP project was substantially impacted by the project planning process. The project execution process and overall performance were discovered to have been substantially harmed by inadequate project planning and ineffective change management to baseline plans. Irungu and Makori (2016) used a target population of 75 agricultural projects in Nyeri County to study characteristics impacting the performance of agricultural based projects in Kenya. The data gathered census survey design and a questionnaire. The factors were regressed at a 5 percent level of significance, and the study found that project team engagement and involvement of stakeholder had a favorable effect on agricultural project overall performance. Muute and James (2019) explored the impact of project planning approaches on construction project performance in Nairobi, Kenya. Respondents included 125 project managers. A semi-structured questionnaire was utilized to gather initial data. The various variables studied were linked by Pearson correlation. From its findings, performance of a construction project is positively and significantly impacted by time management, human resources, financial resource planning and material resource planning. Mwanza, Namusonge, and Makokha (2020) used a mixed study methodology that includes a descriptive survey, census, and correlation to determine the impact of planning practice on the performance of building projects in Kenya. With a sample size of 313 and target population was 1761 people. The study discovered that project planning practices had a negative significant impact on construction project performance. The study also discovered that planning provides a sense of direction to processes that must be completed on time and lowers errors.

Project performance depends on project planning. According to a research by Abbott and Malunda (2016) on promise and the reality, local farmers categorize citizen involvement differently than how it is taken by the government, NGOs, CSOs, and international organizations. Similarly, Kilwinger et al. (2020) did perceptions of farmers on sources for banana planting in

Uganda which revealed that manner in which farmers chose methods for achieving set goals were varied and sometimes influenced by factors like production scale, gender, and expected outcomes.

2.4 Capacity Building and Performance of NARGIP Tissue Culture Banana

To different people, the term "capacity building" means different things. Capacity building, on the other hand, refers to the strengthening or enhancement of a person's or a company's ability to attain its objectives in general. During the 1990s, this term entered the international development lexicon. It entails investing in establishments, human resources as well as practices that help the region's governments accomplish their development goals (World Bank, 2017). Capacity building, as a new kind of capability development, aims to improve the capacities of organizations, individuals and communities. It entails examining their surroundings to identify problems, challenges, requirements, and possibilities, as well as developing methods to address the concerns (ILO, 2012). The performance of fisheries industry is linked to farmer and extension worker capacity improvement.

Five general categories can be used to classify training: refresher or maintenance training, orientation or induction, foundation training, career development as well as on-the-job training (Swanson & Claar, 2014). The appropriate development of extension employees over the course of their employment requires all of these different types of training. Immediately following assignment, new extension staff members get induction training to familiarize them with their roles. The training approach intends to familiarize the new worker with the company and its employees (Halim & Ali, 2018). In-service training, such as foundation training, is suitable for freshly hired employees. Employees have access to foundational training to enhance the base of their service careers and the training is given early in the employment (Swanson & Claar, 2014).

The incumbents are provided with maintenance or refresher training to keep their knowledge of their specific fields current. Staff members can add to their existing knowledge and abilities through refresher training, which keeps them current. In maintenance or refresher training, existing contents are reviewed along with new information and new techniques. This kind of training is necessary to keep employees producing at their highest levels while also preventing them from becoming stagnant (Van Dorsal, 2012). Impromptu or regularly scheduled training,

such as the twice-weekly under the training and visit (T&V) method of extension, is referred to as on-the-job training and is given to the subordinate field staff by the senior officer or subject-matter experts. This training typically focuses on problems or technologies and may factor in formal presentations, casual conversation, and chances to practice new abilities and information in the workplace. Career or development training aims to improve employees' knowledge, abilities, and skills so they can take on more duties in top positions (Malone, 2014).

Globally Arshad and Ab Malik (2015) used panel data analysis to evaluate the effects of human capital on productivity of labor in Malaysia. The fixed effects generalized least squares (GLS) model was used to estimate the study's results. The findings revealed that the quality of human capital had a beneficial impact on labor productivity in Malaysia. Wassem et al, (2019) observed into the impact of capacity building and management assistance on performance of workers. A total of 200 questionnaires were circulated, and data was attained from middle and lower level workers in Pakistan's textile industry. Capacity building tends to have more effect on employee performance, according to the findings. Mullen, Meyer, Gray, and Morris (2017) evaluated the contribution of capacity building to a Bilateral Project in Vietnam run by Centre for International Agricultural Research in Australian. In Vietnam, the researcher conducted interviews with scientists and also visited a forestry research center. The study found that strengthening capacity inside bilateral research collaborations through learning through practice, mentorship program, as well as short-term courses can directly affect the project's outcomes.

Regionally, Onwujekwe et al, (2020) investigated the influence of interventions by capacity-building on organizational and personnel competency for HPSR in Nigeria's endemic disease control. Three training workshops were held for carefully selected participants, including "producers of evidence" like health research experts from three institutions and "users of evidence" in the public health sector, such as policymakers, program managers, and implementers. In their organizations, participants also offered step-down workshops. According to the findings, capacity-building initiatives helped to produce remarkable scientists, policymakers, and practitioners with various levels of expertise in HPSR for endemic control of disease. Murekezi (2015) performed research to establish the effect of human resource capability on project implementation success in local government. Questionnaires were utilized obtain data which were analyzed descriptively and correlational analysis. According to the findings, a strong

link existed between capacity building and successful execution of projects in local government. Robert (2015) also performed research in Rwanda to uncover influence of capacity building on performance in the African Evangelistic Enterprise. The research used a census design. The participants in this study were senior managers and workers from AEE who were active in capacity building. The information was gathered from primary as well as secondary sources. Findings demonstrated a favorable and significant link between capacity development and performance.

Locally, Omondi (2016) looked at how capacity building programs affect project success in NGOs, focusing on Danish Refugee Council. A descriptive survey approach was utilized in this investigation. Percentages, frequency, themes, and cross tabulation were employed to examine the data. The results unveiled that the curriculum material of a capacity building program has an impact on project performance. Mugo et al, (2016) conducted research to unveil the impact of M&E capacity building on long-term viability of food crop programs. The research used a descriptive survey design as well as a correlation strategy. In the agriculture food crops initiatives, the targeted population included one (1) Sub County agricultural officer, 4 additional Sub County officials, 4 extension officers, and 503 farmers. Questionnaires and observation were employed to gather information from extension agents and farmers, while interviews with the Sub County agricultural officer in management and 4 other Sub County officers guided the collection of information. Descriptive approach and inferential technique were employed to analyze data. According to the findings, more capacity building of participants in agricultural food crops programs and officials tend to increase sustainability. In Kenyan charity water projects, Kibe (2017) looked into how stakeholder capacity building impact project performance and employed a descriptive design as well as a total of 66 participants, including six project managers and sixty members of the Project Team. Data were gathered using questionnaires for team members as well as interviews for project managers. As per the study, project success among NGOs water projects in Kenya was positively and significantly impacted by training, sensitization, managerial support, and career development.

According to a research by Abbott and Malunda (2016) on promise and the reality, local farmers categorize citizen involvement differently than how it is taken by the government, NGOs, CSOs, and international organizations. Similarly, Kilwinger et al. (2020) did perceptions of farmers on

sources for banana planting in Uganda revealed that manner in which farmers chose methods for achieving set goals were varied and sometimes influenced by factors like production scale, gender, and expected outcomes. A research by Johnson et al. (2017) on how agricultural development projects seek to empower women demonstrates the importance of clearly articulating project objectives as one of the key project management processes. Harris et al, (2001) in their study argued that participation of farmers in exhibitions leads to exchange for desirable farming characteristics between farmers.

Further studies on capacity building by Nisha, (2006) who studied on understanding extension education, agricultural extension, thus, providing indispensable elements that farmers require to bolster their productivity in agriculture. Karbasioun et al, (2007) researched on supporting duties of extension services for farmers and its implication on extension instructors in Esfahan, Iran revealed that the importance of agricultural extension services and the need for greater involvement in agricultural extension services. According to Ninsiima, (2018) extension services are essential for connecting farmers to other players in the economy as well as for exchanging knowledge, technologies, and agricultural information. Van der Waal, (2008) argued that developing a fair trade model offers farmers a chance to more opportunities, where they may take advantage of consistent contract volumes, get immediate access to export markets, and split upstream profits. Conversely, Bonisoli et al, (2019) postulated in their study that educational tours provide business and economic comparative performance data of tissue culture banana.

2.5 Project Implementation and Performance of NARGIP Tissue Culture Banana

Regionally, In the Gambella Regional State, Semere (2018) probed the causes of agricultural project implementation delays. It looked at 35 agriculture (cotton) initiatives supported by Ethiopia's Development Bank. The investigation was done quantitatively using a causal research design. To evaluate the components that influence delay, a multiple regression approach was used. One of the significant conclusions was that one of the causes was exceedingly inadequate implementation follow-up by relevant staff. Tuchitechi and Lee (2018) wanted to know what factors influence the success of small-scale agricultural projects in Malawi. Data were gathered via a structured questionnaire of 82 extension workers, and multiple regression was carried out. The results showed that farmers' socioeconomic factors, such as high rates of illiteracy and

poverty, low engagement in project implementation, and high dependency syndrome, all had a substantial effect on the success of agricultural programs.

Thaddee, Prudence, and Valens (2020) wanted to know how project management methods influenced the Girinka project's success in the Runda sector of Kamonyi district. Both a case study and an explanatory design were employed in this investigation. The researchers employed questionnaires, documentaries, and interviews to gather information. For quantitative data, descriptive approach was utilized, and for qualitative data, narrative analysis was used. It was discovered that project implementation played a substantial part in success of the Girinka project.

Locally, Odoyo (2013) investigated the factors influencing community project implementation at the Kimira-Oluch Smallholder Farm Improvement Project (KOSFIP) in Kenya's Homa Bay County. Data was collected from the 3,000 families in the region using a case study research design. The study discovered a weakly positive linear association between support of local leaders in KOSFIP project implementation. Kiragu (2015) investigated the impact of project implementation strategies on community project performance. Descriptive survey approach was utilized with a target group of 62 Hand in Hand Eastern Africa staff members involved directly in execution of young moms Programme. Data was collected using a six-segmented questionnaire and structured questions on a Likert scale. The Cronbach Alpha Coefficient utilized to measure reliability. The Spearman's rank correlation was used to determine the statistical reliance of the variables and hypothesis was evaluated. All project implementation methodologies had a positive association with the dependent variable-performance, according to the study. Nduthu Omutoko and Mulwa (2018) studied impact of project implementation approach on performance of indigenous chicken project whereby 80 indigenous chicken project were targeted under support programme. A total of 146 responders were chosen from a pool of 40 projects via a multi-stage sampling process. Data was collected from project implementers and ten partnered stakeholders using a questionnaire and an interview guide, respectively. Means as well as SDev were utilized in evaluating data descriptively. Pearson's correlation and the F-test were employed for inferential analysis. According to inferential analysis, the project implementation procedure had substantial effect on performance of indigenous chicken programs.

Further research conducted by Mulugo et al, (2020) argue that the development and promotion of banana tissue culture should concentrate on banana types that are tolerant of and adaptable to different environmental circumstances. According to Shuen et al. (2017), a fertilizer information system for banana plantations was created to assist farmers in effectively managing information for banana farms in order to maintain the environment and boost quality of tissue culture bananas. Mustaffa and Kumar, (2012) in their study explained the importance of correct spacing that by using closer spacing, the overall outcome and net returns can be raised per unit of area. Increased weed control and wind protection come with closer spacing. A study by Ali et al, (2010) argues that Bananas are often picked by way of hand in a team of two people. One person chops the bunch, and the other person carries it away. A cane knife is utilized in cutting shallow cross in stem that faces the bunch.

According to a research by Johnson et al. (2017) on how agricultural development projects try to empower women, articulating the project's goals is one of the most crucial project management steps. Moreover, Nisha, (2006) in a study on understanding extension education, thus, extension services provide essential components that farmers require in order to increase their productivity. A study by Karbasioun et al, (2007) on Farmers' perceptions of extension services' supportive function and its consequences to farmers in Esfahan, Iran revealed that the importance of agricultural extension services and the need for greater involvement in agricultural extension services.

2.6 Monitoring and Evaluation and Performance of NARGIP Tissue Culture Banana

The significance of adopting M&E in government-owned projects is considered fundamentally important to make sure projects are not concluded within the expected time, budget and quality but also with a view of achieving the beneficiary satisfaction (Mushori, Machira & Matu, 2020). The authors however point out that governments' M&E systems are constrained with financial, technical expertise and stakeholder involvement deficits. Regionally, Sandrine (2018) uncovered the impact of M and E systems on success of Rwandan government programs. The case study and descriptive design were used in this investigation. The usage of a questionnaire was employed as a primary tool of gathering information, while examining project reports was used as a secondary technique of gathering data. Both descriptive approach and inferential technique were utilized to assess quantitative data. Monitoring and evaluation techniques were found to

have a favorable and substantial link with project performance in this study. M and E were found to be critical in improving the project's performance. Bagabo (2020) studied the effect of M and E on project success. A collection of interviews, questionnaires, analyzed financials and other records were employed to achieve the goal. The correlation coefficient revealed that monitoring and assessment have a substantial effect on project success. Okafor (2021) conducted research in Katsina State, Nigeria, to determine the impact of the M and E approach on performance of Reading and Numeracy Activities (RANA) Project. A descriptive survey design was utilized while questionnaires and interview guides too were utilized to gather information. For quantitative data, descriptive statistics and correlation analysis were used, while narrative and theme methods were used for qualitative data. As a managerial function, M and E has an impact on project performance, according to the findings.

In Kenya, Murei (2017a) uncovered the extent to which M and E human resource capability influenced horticulture projects' performance in Nakuru County utilizing a correlation descriptive approach with cross sectional design. The main data gathering procedures were structured Likert scale surveys, KII, and FGD. Pearson's Correlation was calculated after obtaining the arithmetic mean and SDev. The capacity of M and E human resources has a substantial impact on the execution of horticulture projects, according to the findings. In their study, Murei, Kidombo, and Gakuu (2017), attempted to determine how the M and E budgeting affected the success of horticultural projects in Kenya's Nakuru County. A standardized Likert scale was employed to collect quantitative data. KII and FGD groups were used to triangulate the data. Using descriptive information, the Pearson's Correlation Coefficient was determined. The findings revealed that the M and E budget made a considerable contribution to horticulture's outstanding performance, as evidenced by a statistically significant correlation coefficient. In Galana Kilifi County, Kenya, Ocharo, Rambo, and Ojwang (2020) set out to determine how M and E frameworks affected the performance of public agricultural projects. The idea that there is no meaningful connection between M and E frameworks and the effectiveness of agricultural initiatives in Galana Kilifi County, Kenya, was put to the test using inferential statistics. A mixed methods approach was adopted utilizing descriptive survey and correlation research techniques. Structured questionnaires and an interviews were employed to gather data. Pearson's Correlation Analysis was used to assess non-parametric data descriptively.

The study found a link between M&E frameworks and the performance of public agricultural initiatives in GalanaKilifi County, Kenya.

A study by Purnawan et al. (2021) unveiled that financial assistance is used by farmers to meet a variety of needs, including the costs of their children's education, healthcare expenses, family savings, and asset improvement. Additionally, financial assistance is also used to help farmers increase their farming production. Danso-Abbeam et al, (2018) show that the farmers timely farm reports help improve their productivity and also profitability. Finally, Brown et al, (1992) explain that farmer meetings are meant to collect input on needs, challenges, and proposed solutions, train on new technologies or process innovation, collect feedback on technologies or process innovations and promote farmer to farmer learning.

2.7 Combined Project Management Practices and Performance of NARGIP Tissue Culture Banana

Adoption of project management methods is becoming a fundamental strategy for increasing project performance through successful project execution (Meredith, Shafer & Mantel 2017). Most importantly, project managers are on the front lines when it comes to ensuring client satisfaction (Kerzner, 2018), emphasizing the significance of project management methods in project performance. According to Cleden (2017), improving project performance necessitates focused management attention, which can only be supplied by professional, committed, well-organized, and knowledgeable project teams who use project management practices. A growing interest in the competency of project managers and the adoption of project management practices is a result of increasing demand on project performance.

Kihoro and Waiganjo (2015) indicated that skills and experience of the implementers in general influences implementation thereby impacting on project performance. This study by Kihoro and Waiganjo (2015) only looked at planning, expert skills, stakeholders' involvement to have an influence on project performance but it overlooked other variables like legal framework and execution. Therefore, studies by Ceylan (2010) agreed with the study of Kihoro and Waiganjo (2015) but included project execution to impact on performance of project. Likewise study on influence of implementation principles on performance of project by Usman, Kamau and Mireri, (2014) done in Abuja, Nigeria findings indicated that performance was influenced by good project implementation, adequate planning and resources provisions for project execution.

However, study by Usmanet *al.*, (2014) does not show how resources would be mobilized but indicated budgetary and costly project execution to influence performance.

Globally Ling, Low, Golini, Kalchschmidt and Landoni (2015) looked at the impact of project management approach on project performance. Nearly 500 project managers from around the world were surveyed. Results found that project management approaches play a significant role in improving internal project performance. Regionally, with reference to construction enterprises situated in Kigali, Kanyago, Shukla, and Kibachia (2017) explored the impact of construction management skills on performance. A descriptive approach was utilized targeting 111 construction firm workers in Kigali, giving a sample size of 33 responses. Questionnaires were the primary tools of gathering data and in analysis, the study utilized both quantitative approach and qualitative research methods. According to the findings, proper project management procedures like risk management, planning, M & E aim to protect the project from current and potential hazards of failure. Unegbu, Yawas, and Dan-asabe (2020) evaluated the link between project management methods and project performance measures in construction business in Nigeria. The questionnaire was a tool for gathering data in the survey research approach. The path coefficients and quality of fit indices were used to evaluate and validate a hypothetical SEM model. The research discovered a link between project performance metrics and project management approaches. Daniel (2019) looked on the impact of project management technique on performance of a few construction businesses in Nigeria. Using a disproportionate stratified sample procedure, questionnaires were issued to 272 personnel in the engineering and project departments specific construction enterprises. Descriptive statistics, a linear model, and Pearson correlation were utilized to examine the data. According to the findings, project management approach improves performance.

Locally, Magana and Yusuf (2019) investigated how project management approaches impacted performance of various food security projects within Kilifi County. To conduct a complete and useful evaluation of the initiatives, a descriptive design was considered. The project's target audience consisted of all stakeholders in Kilifi County's food security projects, who were sampled randomly into a sample of 128 people. Questionnaires were mostly employed to acquire primary data for the study. Descriptive approaches were used to examine quantitative data, and inferential statistics were utilized to determine correlations between variables. Monitoring and

assessment, leadership, stakeholder analysis as well as management of scope whereby they all had positive and substantial effects on the effectiveness of food security programs, according to the study. Simiyu (2018) also probed if project management approaches impacted the performance of agricultural enterprises run by CBOs in Bungoma County. Descriptive and explanatory research designs were utilized. Questionnaires which are self-administered were utilized to obtain primary data. In addition, 15 field officers were interviewed. The results of descriptive statistics and a multiple regressions model revealed that project implementation had a substantial effect on performance of the project. Magagan and Ngugi (2021) evaluated impact of project management approaches on Unilever Company's performance in Nairobi, Kenya. A descriptive approach was utilized while data was obtained utilizing a semi-structured questionnaire and a census. According to the findings Project management approaches have a beneficial effect on performance of project.

2.8 Theoretical Framework

A theoretical foundation sought to bridge the gap between what has been done previously and the thought on which the study is based on. A theory is a presentation of thoughts and views of individuals or groups of people describing certain phenomenon based on their experiences, perceptions or understanding (Robson, 2011). The research was hinged on three major theories. These theories are; project management competency theory, theory of constraints and resource based view theory.

2.8.1 Project Management Competency Theory

McBer and Mclelland developed the competence philosophy in the 1980s, and termed competence as ability of a person to do tasks remarkably in a specified circumstances. It is a collection of interconnected abilities, attitudes, and characteristics, personal as well as information that drives and empowers people to perform in their own way. Competency is a relative skill that can be improved via training and development, but it is crucial in determining performance (Magagan, & Ngugi, 2021).

The impact of project management competency on project administration and control dynamics that jeopardize project success is the focus of project management competency theory. A technical project manager on a mission to deliver extraordinary results by efficiently

implementing knowledge techniques and abilities. Garish and Huemann (2014) also emphasized the need of selecting from a variety of performance-enhancing management styles and technologies. Furthermore, Edum-Fotwe (2011) found that a manager's level of expertise is closely related to the complexity of strategy he or she can successfully implement. In this regard, organizations are increasingly aligning project management with manager competency in order to achieve optimal results. The human resource department is now assessing the skill levels of each team, with the goal of training and developing employees to the appropriate competency levels (Houston, 2008).

This study was informed by project management competency theory, which outlines the contextual as well as technical abilities and competencies that should be possessed by project managers in order to complete projects in accordance to set budgets, on schedule, with desired quality as well as covering scope (Clist and Morrissey, 2011). In this era of advanced technology, project management teams must be supervised and have increased competency. Lewis (2010) used this idea to look into how competency and skills influenced major Swedish enterprises' project management. It was also useful in Kometa and Jubb's (2007) assessment of successful competency profiles in the sector. The theory therefore addresses the fifth objective which relates to the combined effect of project management practices and project performance. This is because when all project management practices are in place there is good performance.

2.8.2 Theory of Constraints

The research was based on Goldratt's Theory of Constraints (TOC), which is a collection of management theories developed in the 1990s (Goldratt, 1990). TOC effectively concentrates efforts, resources, and attention on the system bottleneck, which limits total or overall system yield while also addressing the critical use position for its improvement. On the most basic level, TOC necessitates the recognition, oversight, and management of constraints in order to illustrate: on-time and in-full delivery to organizational clients, effective supply chain to eliminate shortage in stock, effective process control and minimization of firefighting, reduction in cycle time frames and thus records, lesser prolonged conflicts among team members and rapid reaction culture, revealing additional volumes of production. To do this, TOC shifts management's focus from optimizing discrete assets, functions, and resources to increasing the overall system's throughput movement. TOC's procedures and processes are focused on removing roadblocks that

prevent each component from working as a cohesive one (Eidelwein, Piran, Lacerda, Dresch, & Rodrigues 2018). Each and every system ought to have a bottleneck or limitation that administer its output and results, just like the weakest link in a system or chain (Sarkar, & Patel, 2021). Whether or not they are recognized, constraints limit output. Constraints give a quick path to decisive change and profile the foundations for unending expansion when properly recognized and controlled. When a limitation is ignored, it may sit out of gear, wasting a lot of competence. A limit that is out of control can also wreak havoc on delivery schedules and cause unexpected delays. As a result, it is critical for any management to maximize the value of their constraint and effectively manage it. The use of the Theory of Constraints has yielded excellent benefits for businesses and organizations all over the world. This theory is used to address the variable performance of banana tissue culture projects. Banana farmers who have faced the constraints in the banana production may adopt tissue culture in order to address the constraints.

2.8.3 Resource Based View Theory

Wernerfelt and Rumelt came up with the Resource Based View (RBV) idea in the 1980s as one of several strategic management methods. It is the framework for organizing a firm's resource allocation so as to gain a long-term competitive advantage (Barney, 1986). The argument is based on evidence that highly competitive and high-performing firms have a wide pool of resources at their disposal. As previously said, resources are generally insufficient, but project manager's success is defined by how efficient they can maximize them. When this not being the case, manager has more power and can do more to provide better outcome without worry of exceeding the project's budget (William & Dettmer, 2010). Resources might be tangible, such as machinery, or intangible, such as experience or a trademark. The resources at a company's disposal have a direct impact on project delivery. Thus, the RBV theory is quite relevant to this research in terms of illustrating cost as a success predictor in payment solution performance. According to the fathers of RBV theory, Rumelt (1984) and Wernerfelt (1984), technological, financial as well as physical resources are combined in the managerial environment to determine payment solution success. The success rate of projects is linked to performance, making payment performance crucial. The idea is relevant to the study since it describes a decisive factor in the success of financial technology enterprises. The theory will anchor the variables including

project planning capacity building project execution and M and E as resources that help in project performance.

2.9 Conceptual Framework of Project Management Practices and Performance of Tissue Banana of National Agricultural Rural Inclusive Growth Project

The framework in (Figure 1) provides the basis of the study by illustrating how the variables flow and relate to each other (Lee, 2008):

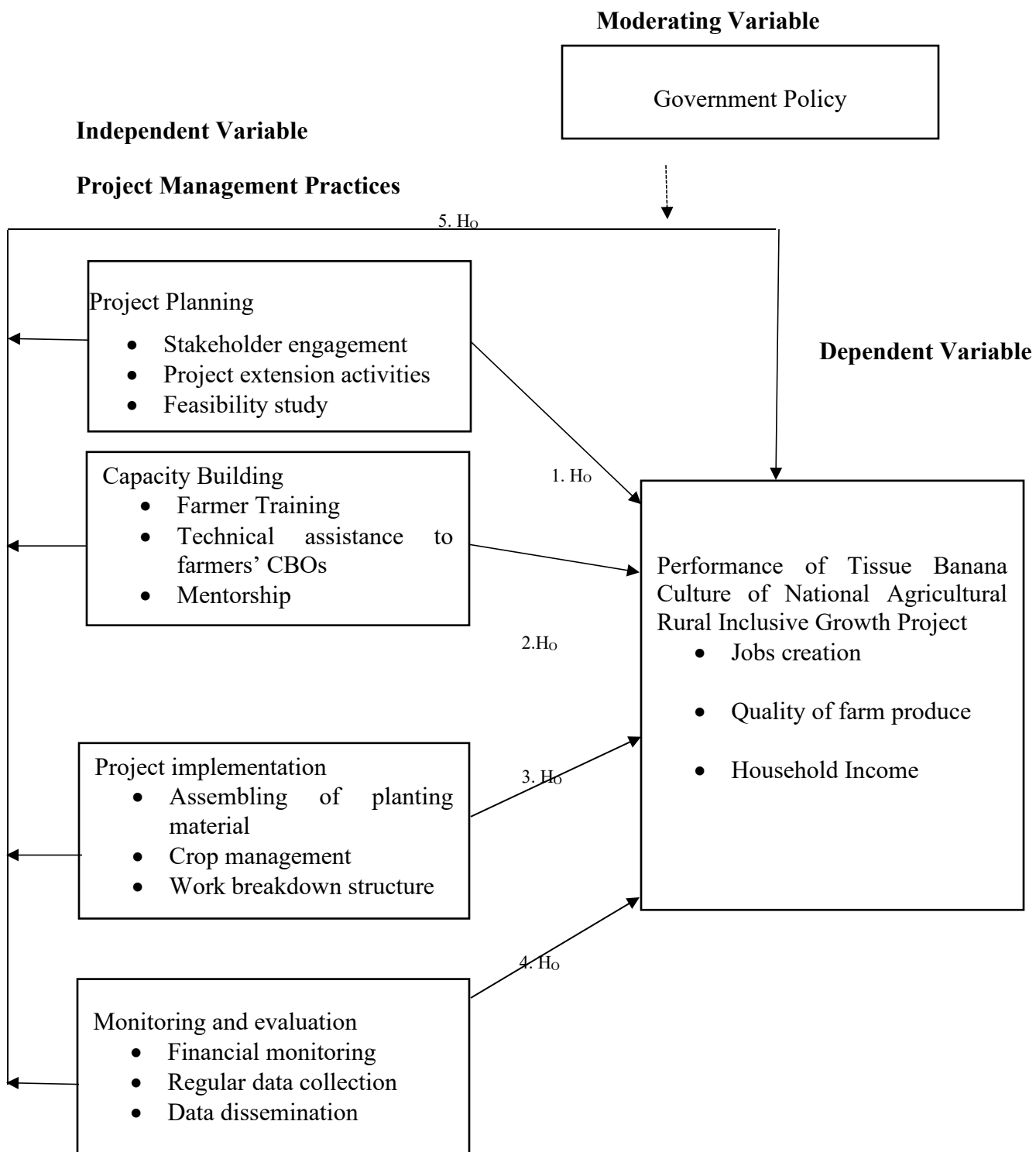


Figure 1: Conceptual Framework of Project Management Practices and Performance of Tissue Banana Culture of NARIGP

The conceptual framework (Figure 1) is an interrelationship between the independent variable, broken down from the project management practices, which shows that project planning, capacity building, project implementation and M&E are key predictors on the dependent variable which is performance of Tissue Banana Culture of the NARIG. It is illustrated and hoped that when the four independent variables are combined together, they would have a positive influence on the dependent variable.

Table 2.1: Knowledge gap

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
Project Performance	Kikulwe, E. M., Kabunga, N., & Qaim, M. (2012).	Impact of Tissue Culture Banana Technology in Kenya: A difference-in-difference estimation approach	Descriptive survey, questionnaires, correlation analysis	Tissue Banana culture contributes to farmer profits	Contextually the study was not done in Vihiga County thus the current study.
Project Planning	Naeem, Khanzada, Mubashir and Sohail (2018)	Impact of project planning on project success with mediating role of risk management and moderating role of organizational culture.	Questionnaire regression and correlation	Project success is positively and significantly co-related to the project planning.	The study did not focus on banana tissue culture
	Lemma (2014)	The role of project planning on project performance in Ethiopia	Questionnaire	Main planning input factors that affect the performance of planning processes are: - human, management, technical and organizational factors	The study was not conducted among tissue culture banana
	Umulisa, Mbabazize and Shukla (2015)	Effects of project resource planning practices on project performance of Agaseke project in Kigali city in Rwanda	Questionnaire focus group discussion in-depth interview guide		The geographic location in Rwanda may differ in terms of the way projects are done from Kenya.

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Christian and Nyambane (2021)	Contribution of planning to the project performance	causal research design structured questionnaire descriptive statistics and multiple regression analysis	Positive significant linear relationship between planning and projects performance	
	Ngure (2013)	Determinants influencing performance of Agricultural projects with special reference to the NALEP projects in Ruiru District	Descriptive research design questionnaire	project planning process greatly influenced the performance	Not conducted among banana tissue culture
	Irungu and Makori (2016)	Determinants influencing performance of agricultural projects in Kenya	census survey design questionnaire	Project team and stakeholder involvement had a positive impact on the overall performance of agricultural projects	Not conducted in Vihiga county
	Muute and James (2019)	Effects of project planning practices on performance of construction projects in Nairobi City County, Kenya.	semi structured questionnaire Pearson correlation analysis	Human resource planning, time management, material resource planning and financial resource planning positively and significantly contributes to performance of the construction projects	Conducted among construction projects and not agricultural projects
	Mwanza, Namusonge and Makokha (n.d)	Influence of planning practice on performance of construction projects in Kenya	Mixed research design	Project planning practice had a negative significant influence on performance of construction projects.	Conducted among construction projects and not agricultural projects

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
Capacity Building	Arshad and Ab Malik (2015)	Impacts of human capital on labor productivity in Malaysia	Panel data analysis generalized least squares (GLS) model	Human capital quality is positively significant in improving the level of labor productivity	The study context was in Malaysia and focused on labour productivity as the dependent variable. A different research design to be used.
	Wassem, Baig, Abrar, Hashim, Zia-Ur-Rehman, Awan and Nawab (2019)	effects of capacity building and managers' support on employee performance	Self-administered questionnaire survey	Capacity building has a positive and significant impact on employee performance	Not conducted n Kenyan context
	Mullen, Meyer, Gray and Morris (2017)	contribution of capacity building to an (ACIAR) Bilateral Projects	Interviews	Capacity building within bilateral research projects through mentoring, learning by doing and short courses may contribute directly to the outcomes of a particular project	Not conducted n Kenyan context
	Onwujekwe, Mbachu, Etiaba, Ezumah, Ezenwaka, Arize and Uzochukwu (2020)	Impact of capacity building interventions on individual and organizational competency for HPSR in endemic disease control in Nigeria.	Training workshops	Capacity-building interventions contributed to the development of a critical mass of research scientists, policy makers, and practitioners who have varying levels of competencies in HPSR for endemic disease control	Not conducted in Kenyan agricultural projects context

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Murekezi (2015)	Influence of human resource capacity in achieving goal in Local government on performance of implementation of project	Questionnaires descriptive and correlational analysis methods	Significant relationship between capacity building and successful implementation of local government projects.	Not conducted among agricultural projects
	Robert (2015)	Impact of capacity building and performance in African Evangelistic Enterprise-Rwanda	census design	Positive and significant relationship between capacity building and performance	Not conducted in Kenyan agricultural projects context
	Omondi (2016)	Influence of capacity building programs on project performance in non-governmental organizations with a special interest on the Danish Refugee Council.	descriptive survey design frequencies, percentages, themes and cross tabulation	Project performance is influenced by the curriculum content of a capacity building program	Was conducted among non-governmental organizations which allows for further study among projects that are government based
	Mugo, Keiyoro, Iribe and Rambo (2016)	Influence of M & E capacity building on sustainability of food crop projects.	Descriptive survey design and correlation design Questionnaires and observation descriptive statistics and inferential statistics	With more capacity building of members in Agricultural food crop projects and officials sustainability will be enhanced	Study was conducted in <u>Nyeri</u> county

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Kibe (2017)	Effect of stakeholder capacity development on project performance in nongovernmental water projects in Kenya	descriptive survey research design structured questionnaires and interviews	Training, community sensitization, management support and career development had a positive and significant effect on project performance in non-governmental water projects in Kenya.	Not conducted among agricultural projects
Project implementation	Semere (2018)	Determinants of agricultural projects implementation delays in Gambella Regional State.	causal research design multiple linear regression analysis	Extremely poor implementation follow up by the relevant staff, as one of the determinants	Not conducted in Kenya
	Tuchitechi and Lee (2018)	Factors influencing the performance of agricultural projects for small farmers in Malawi.	structured questionnaire survey multiple regression analysis	Farmers' socioeconomic factors, including high illiteracy and poverty rates, poor participation regarding project implementation, and high dependency syndrome, significantly affected the performance of agricultural project	Not conducted in Kenya
	Thaddee, Prudence and Valens (2020)	Contribution of project management practices on project success of the Girinka project in Runda sector, Kamonyi district	Case study and explanatory design questionnaire, documentary and interview Schedules descriptive statistics narrative analysis	Project implementation contributed to Girinka project success at very large and large extent.	Not conducted in Kenya

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Odoyo (2013)	Factors affecting implementation of community projects at Kimira – Oluch Smallholder Farm Improvement Project (KOSFIP) in Homa Bay County, Kenya	Case study research design	Weak positive linear relationship between local leaders support for implementation of KOSFIP project	Not conducted among tissue culture banana projects
	Kiragu (2015)	Influence of project Implementation strategies on performance of community projects	Descriptive survey design questionnaire Spearman's rank correlation coefficient	All project implementation strategies had a positive correlation on the dependent variable-performance.	Not conducted for agricultural projects
	Nduthu Omutoko and Mulwa (2018)	Influence of project implementation process on performance of indigenous chicken projects	Questionnaire and interview guide descriptive and inferential analysis (Pearson's product moment correlation and F-test)	Project implementation process influenced performance of indigenous chicken projects statistically significantly	Not conducted among tissue culture banana projects
M&E	Sandrine (2018)	Influence of M&E mechanisms on the performance of Government projects in Rwanda	case study and descriptive design questionnaire reviewing reports descriptive and inferential statistics	Positive and significant relationship between M&E mechanisms and project performance	Not conducted in Kenya
	Bagabo (2020)	Effect of M&E on project performance	questionnaires, interview correlation coefficient	M&E has very high effect on the Project performance.	Not conducted in Kenya

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Okafor (2021)	Influence of the M&E system on the performance of the Reading and Numeracy Activities (RANA) Project in Katsina State of Nigeria	descriptive survey research design questionnaires and interview guides descriptive statistics and correlation analysis narrative and thematic methods	M & E indeed has an influence on project performance as a management function.	Not conducted in Kenya
	Murei (2017a)	Extent to which M&E human resource capacity influences performance of horticulture projects in Nakuru County	cross sectional and a correlation descriptive survey Structured questionnaires Informant Interviews and Focus Group Discussions Arithmetic mean and SDev were generated and Pearson's Product Moment Correlation Coefficient	M &E human resource capacity had a significant influence on performance of horticulture projects	Conducted in Nakuru county and not in Vihiga county
	Murei, Kidombo and Gakuu (2017)	Influence of M&E budget on performance of horticulture projects in Nakuru County in Kenya	cross sectional and a correlation descriptive survey Structured questionnaires Informant Interviews and Focus Group Discussions Arithmetic mean and SDev were generated and Pearson's Product Moment Correlation Coefficient	M&E budget was a major contribution to high performance of horticulture as shown by a correlation coefficient which was statistically significant.	Conducted in Nakuru County and not Vihiga county

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Ocharo, Rambo and Ojwang (2020)	How M & E frameworks influence performance of public agricultural projects in Galana Kilifi County, Kenya	mixed methods research structured questionnaires and interview schedule inferential statistics	M&E frameworks was correlated to performance of public agricultural projects in Galana, Kilifi County, Kenya	Not conducted in Vihiga county and among banana tissue cultures
Combined Project Management Practices	Golini, Kalchschmidt and Landoni (2015)	Impact of the PM practices on project performance	International surveys	Project management practices significantly contribute to enhancing internal project performance	Not conducted in Kenyan agricultural projects context
	Kanyago, Shukla and Kibachia (2017)	Role of construction project management skills on performance of construction projects with reference to construction firms based within Kigali.	Descriptive research design Questionnaires	Proper project management practices such as planning, risk management, and monitoring and control seek to cushion the project against present and potential risks or failure	Not conducted in Kenyan agricultural projects context
	Unegbu, Yawas and Dan-asabe (2020)	Relationship between project performance measures and project management practices of construction projects for the construction industry in Nigeria	Survey research questionnaire Hypothetical SEM model	A relationship exist between project performance measures and project management practices	Not conducted in Kenyan agricultural projects context
	Daniel (2019)	Effect of Project Management on the Performance of Selected Construction Firms in Nigeria.	survey research design questionnaire descriptive statistics, linear regression model, and Pearson product moment correlation	Project management practice enhance performance.	Not conducted in Kenyan agricultural projects context

Variable	Year and Author	Title of the Study	Methodology	Findings	Knowledge Gap
	Magana and Yusuf (2019)	How the project management practices affected food security projects performances in Kilifi County	Descriptive survey design questionnaires descriptive statistical techniques and inferential statistics	M&E, stakeholder analysis, leadership, and scope management had positive and significant effects on the performance of food security projects	
	Simiyu (2018)	Influence of project management practices on the performance of agricultural projects by community based Organizations in Bungoma County	Descriptive and explanatory research designs self-administered questionnaire and Interviews Descriptive statistics and multiple regressions	project implementation was a significant influence on project performance	Location was Bungoma county and not Vihiga county
	Magagan and Ngugi (2021)	Influence of the project management practices on project's performance of Unilever Company in Nairobi County, Kenya.	Descriptive research design Questionnaires	Project management practices have a positive influence on project performance	Not conducted in agricultural projects context

2.10 Summary of the Literature Review

This sought to shed light on various variables of the study and how they relate to each other for the purposes of performance of NARIGP. The chapter captured reviewed literature as well as theoretical and conceptual underpinnings. The theories, concepts, and ideas that served as the foundation for the research were highlighted in the theoretical framework. Project management competency theory, theory of constraints, and RBV theory served as the study's main pillars. Additionally, some pertinent empirical studies that address project planning, capacity building, project implementation, M and E in connection to the performance of tissue culture bananas have been examined and presented. To further describe the primary characteristics of the study, a conceptual framework was presented, highlighting the association between the important variables. Finally, a table illustrating the topic area's knowledge gaps was created from the examined publications, which further demonstrated the necessity for this research study.

The literature review has been drafted adhering to study concepts and the its variables, such as project planning, capacity building, project implementation and monitoring and evaluation in relation to performance of tissue culture banana. The literature point to a rising need for project management practices in the performance of national agricultural rural inclusive growth projects. The reviewed studies demonstrated the significant importance of project planning, capacity building, project implementation and monitoring and evaluation in the successful management of tissue culture banana.

According to the analysis of the literature, project performance is a broad term with a variety of indicators. According to a body of literature, the satisfaction of stakeholders, scope, time, and cost dimensions can all be used to gauge a project's performance (Muller & Jugdev, 2012). When evaluating project management, Kerzner(2018) found that scope was a key metric for gauging the project's performance. The project's quality as it is being delivered is the main factor taken into account while evaluating the scope. In fact, Meng (2012) considered quality to be another metric used to assess the project's performance. Non-conformance reports can be considered while evaluating quality performance,

particularly for ISO-certified businesses. The degree of client happiness can be taken into account while analyzing quality issues (Di-Maddaloni&Davis, 2017).

Project performance makes sure that a company optimizes earnings while minimizing the risks and uncertainties associated with achieving the project's goals. Simiyu (2018) evaluated the effectiveness of agricultural projects using metrics such project goal achievement, budget compliance, product quantity, and product quality. To improve efficacy and conformance with quality performance at the project's conclusion, it is crucial to explicitly and plainly establish the quality standards at the planning process. Further, study by Zairi (2012) showed that project performance may be measured on the basis of financial measures (household income) customer measures (customer satisfaction) and project success measures (quality of the produce). As per a study conducted by Kikulwe et al. (2012), banana tissue culture adoption has beneficial effects on banana output and revenues. Therefore, the technology of banana tissue culture can greatly aid in the rural growth of Kenya's small agricultural sector.

The reviewed literature on project management practices on performance of tissue culture banana project has unveiled both conceptual as well as methodological strengths and limitations. The review and critique of literature is guided by the core concepts of the study that include project planning, capacity building, project execution and M and E in regards to performance of tissue culture banana. The selection of the project's goal, the specification of the resources needed and their allocation, the choice of delivery methods, the handling of urgent situations, and the evaluation of activities and results are all stages of project planning process (Watt, 2014). The planning stage's goal is to focus on the project's task breakdown, costing, resources availability, and timeline. Naeem *et al.* (2018) investigated the effect of project planning on success of a project and discovered that it has a beneficial effect which significantly co-related to the project planning. The study did not focus on banana tissue culture.

Lemma (2014) aimed to evaluate how project planning affected project performance in Ethiopia on a regional level. According to Lemma's (2014) research, human, technical, management, and organizational aspects are the primary planning input

variables that influence how well planning processes operate. Banana tissue culture was not used in the study. In Kigali City, Rwanda, Umulisa et al. (2015) evaluated the influence of project resource planning procedures on project performance. The geographic location in Rwanda may differ in terms of the way projects are done from Kenya. Locally, Ngure (2013) investigated the factors influencing agricultural projects' performance, with a focus on the NALEP projects in the district of Ruiru and unveiled that project planning process had a substantial effect on the NALEP project's performance. The study was not conducted on banana tissue culture. Irungu and Makori (2016) used a target population of 75 agricultural projects in Nyeri County to study characteristics impacting the performance of agricultural projects in Kenya. The study found that project team as well as stakeholder involvement had a favorable impact on agricultural project overall performance. This study focused Vihiga County that is largely practices banana farming.

Capacity building, on the other hand, refers to the strengthening or enhancement of an organization's or a person's ability to attain goals in general. Capacity building, as a new kind of capability development, aims to improve the capacities of individuals, communities, and organizations. Arshad and Ab Malik (2015) used panel data analysis to evaluate the effects of human capital on productivity of labor in Malaysia. The findings revealed that the quality of human capital had a beneficial impact on labor productivity in Malaysia. The study context was in Malaysia and focused on labour productivity as the dependent variable. A different research design to be used. Wassem *et al.* (2019) on impact of capacity building and management assistance on employee performance unveiled that capacity building has a favourable and substantial effect on performance of workers, according to the findings. Although, it was in a different context and not Kenyan creating a contextual gap.

Regionally, Murekezi (2015) performed research to unveil effect of human resource capability on project implementation success in local government. According to the findings, there is a strong link between capacity building and successful execution of local administrative projects. The study was not conducted among agricultural projects. Locally, Mugo *et al.* (2016) conducted research to establish the impact of M&E capacity building on long-term viability of food crop programs. Found that more intense capacity

building practices for Agricultural food projects bolstering officials' sustainability. The study was undertaken in Nyeri County contrasting current study that focused on Vihiga County.

In terms of project implementation, Semere (2018) in Gambella Regional state concentrated on discovering factors that contributed to the delays in the execution of agricultural projects. The relevant staff was determined to have extremely poor implementation and follow-up. as one of the determinants. However, the study was not conducted in Kenya. Tuchitechi and Lee (2018) wanted to know what factors influence the success of small-scale agricultural projects in Malawi. According to the study, farmers' socioeconomic variables, such as their high rates of illiteracy and poverty, low engagement in project execution, and high dependency syndrome, had a substantial impact on how well agricultural projects performed. However, the study was not conducted in Kenya focusing on tissue banana projects. Locally, Odoyo (2013) investigated the factors influencing community project implementation at the Kimira-Oluch smallholder farm improvement project in Homa Bay, Kenya. Findings unveiled a weak positive linear association between local leaders' support for KOSFIP project's implementation. Not conducted among tissue culture banana projects.

The significance of adopting M&E in government-owned projects is considered fundamentally important to make sure projects are not completed within the expected time, budget and quality but also with a view of achieving the beneficiary satisfaction (Mushori, Machira & Matu, 2020). The authors however point out that governments' M&E systems are constrained with financial, technical expertise and stakeholder involvement deficits. Regionally, Sandrine (2018) investigated the effect of M & E systems on success of Rwandan government programs. M&E techniques were found to have a favorable and substantial link with project performance in this study. Not conducted among tissue culture banana projects. Murei (2017a) investigated the extent at which M & E human resource capacity impact performance of horticultural projects in Nakuru. M & E human resource capacity recorded a substantial effect on performance of horticultural projects. It was conducted in Nakuru county and not in Vihiga County.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Methodology is the presentation of the procedures, tools, and approaches to be used when carrying out the actual study (Creswell, 2010). The study as well focused on carrying out primary study thus the chapter herein outlines the methodology to be used. Specifically, it covers research design, population, and technique of sampling as well as sample size determination. To be included in the chapter also is the research instrumentation, pilot study, validity as well as instruments' reliability, methods of gathering data and its analysis.

3.2 Research Design

Both a descriptive survey research design and a correlational research approaches were used. A descriptive survey research is utilized to get the respondents to explain specific aspects of the subject under study whenever the topic is well-designed, the researcher can conduct a field study by visiting the population of interest (Creswell, 2013). Hence, the design was deemed appropriate since it entails a more exact and accurate representation of occurrences and was properly thought out (Babbie, 2012). Descriptive research design portrays the full characteristic feature of a population (Chandran, 2014). Descriptive survey research is both quantitative and qualitative thus making it appropriate for this study. Moreover, the design enabled the study to capture more information thus giving a wider room for conclusions and recommendations. The correlational research designed was utilized to assist in the analysis of explaining the link between the independent variable and dependent variable and further carry out regression analysis.

3.3 Target Population

This research targeted population was 296 comprising of 284 tissue culture banana beneficiaries in Hamisi Sub County and 12 staff members involved in the project (Appendix II: Letter from NARGIP). The 284 beneficiaries are drawn from 11 community based organization practicing Tissue Culture Banana farming in the five wards of Hamisi Sub-County. Lavrakas (2017) submits that, the target population entails

the number of items, components or objects, which a researcher concentrates on in order to infer the results of the study. Cameron, et al. (2015), defines population as the entirety of the large group. Stokes (2011), similarly observes that, population comprises the entire group of persons the researchers intend to research on.

Table 3.1: Target Population

No.	Category	Target Population	Number of population per category
1.	Ward Beneficiaries	Banja	63
		Gisambai	46
		Shiru	74
		Tambua	57
		Shamakhokho	44
2.	NARGIP officials	Hamisi Sub-County	12
	TOTAL		296

Source: 'NARIGP-County of Government of Vihiga (2021)

3.4 Sample Size and Sampling Procedure

The segment highlights the sample size and procedure of sampling.

3.4.1 Sample Size

The study sample size was 170 obtained from a population of 296. A sample size is a population subset in which the researcher aims to spread the results. Lavrakas (2017), opines that a sampling method is procedure for selecting a proper sample to identify the parameters for selecting representative respondents from the accessible population. Samples are limited parts of a population whose features are assessed to obtain information on the entire population (Kothari 2015). ISlovene's (1978) formula was appropriate to obtain suitable sample size for the research from a population of 296 participants as presented below:

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

N = Population

e = Acceptable margin of error

n = Sample

A confidence interval of 95 % and a margin of error of 5% was used. In applying Slovene's formula, fixed (total) sample size was;

$$n = \frac{296}{1 + 296(0.05)^2}$$

$$n = \frac{296}{1 + 296 (0.0025)}$$

$$n = 170$$

The calculated sample size was proportionately distributed across the various categories

Table 3.2: Sample Size

No.	Category	Target Population	Number of population per category	Proportionate sample size
1.	Ward Beneficiaries	Banja	63	36
		Gisambai	46	26
		Shiru	74	43
		Tambua	57	33
		Shamakhokho	44	25
2.	NARGIP officials	Hamisi Sub-County	12	7
	TOTAL		296	170

3.4.2 Sampling Procedure

The study adopted a stratified sampling and proportionate technique to get the right total sample size and proportionate sample for each category. The stratification was done on the wards represented which are Banja, Gisambai, shiru, Tambua, Shamakhokho and Hams Sub County. The simple random sampling was also utilized to sample out individual respondents which gives equal opportunities for all participants in the process of collecting data.

3.5 Research Instrument

A structured questionnaire was utilized as the primary tools for gathering data. In both the structured questionnaire composed of closed ended statements and open-ended questions. Closed ended questions in a Likert form were used to generate quantitative data which eases analysis process as it can instantly be utilized. The open ended questions at the end of each section of the questionnaire and structured interview schedule were based on research questions that sought the respondent's opinions on what they perceive as factors influencing performance of NARGIP's tissue culture banana project. Miller (2002) define a structured interview schedule as a quantitative approach whereby interviewer employs a set of prepared closed-ended questions designed as interviews. Interview schedules come in handy while working with a varied community that has varying literacy levels.

The structured questionnaire (Appendix IV) was designed in the following sections: Section A, collected data on demographics of the participants; Section B, Performance of Tissue Culture Banana; Section C, project planning and Performance of Tissue Culture Banana; Section D, capacity building and Performance of Tissue Culture Banana; Section E, project implementation and Performance of Tissue Culture Banana; and finally Section F, monitoring and evaluation and Performance of Tissue Culture Banana.

3.5.1 Pilot Testing of the Instrument

The pilot study was done in Nyamira where TC banana is being practiced where five questionnaires and 12 structured interview schedules were administered to respondents in the period June 15th to July 15th 2021. Prior to its application in the chosen sample, the

questionnaires were piloted to improve the questions in accordance with the study questions. The pilot study, data collection and analysis phases each required one week. A pilot test was carried out to reveal any errors in the instrumentation and to give proxies for data needed to choose a probability sample. This was accomplished by using 10% of the sample size. According to Akhtar (2016), 10 to 15% of the sample size is appropriate for piloting. The NARIGP in conjunction with Bungoma County Government work in partnership to support farmers to develop and improve the production of the value chains in banana production. NARIGP helps the community by investing in four areas: nutrition, vulnerable marginalized populations, market-oriented livelihood interventions, and finally sustainable land management and value chains. According to Mohajan (2017), the validity and reliability of tools have a significant impact on the correctness of the data that gathered.

3.5.2 Validity of the research instrument

The study used content validity and construct validity. Validity is the level to which a research tool estimates what it should quantify and perform the way it's expected to work (Price, Jhangiani & Chiang, 2015). Salkind (2010) asserts that the level to which elements on a test are fairly reflective of the full outcome the test tries to measure is referred to as content validity. Construct validity, conversely, entails how well the measurements used, which are frequently questionnaires, truly test the premise or theory being measured (Ginty, 2013). In checking content validity, the supervisor helped in going through questionnaire to align it with study objectives. Construct validity entailed checking the questionnaire to see if it aligns with constructs in the conceptual framework and also the reviewed literature.

3.5.3 Reliability of Research Instruments

Reliability was done afterwards by employing Cronbach's Alpha Test which measures the consistency by demonstrating if, all components in a scale measure identical constructs and, if data collected from every independent variable is significant to the dependent variable. As a consequence, reliability is characterized as the consistency of findings over time and the exact depiction of the total population that is being studied,

while research instruments are considered reliable if the study results can be replicated under similar circumstances (Price, Jhangiani & Chiang, 2015). Cronbach's Alpha is defined as an internal consistency coefficient used to measure the reliability of collected data. Gwet (2014), advanced a value of 0.7 as a suitable measure of reliability, however, lesser levels are occasionally used in research. Cronbach's Alpha value that was achieved by laying out an analysis of tools' reliability, whereby a suitable minimum value was, be 0.7.

Table 3.3: Reliability Statistics

Variables	Number of Items	Cronbach Alpha
Project planning	9	0.700
Capacity building	9	0.782
Project implementation	9	0.860
Monitoring evaluation	9	0.884
Performance of tissue culture banana project	9	0.950

The results above unveil that cronbach's alpha for all items were above 0.7 indicating that the tool was adequately reliable for measurement and therefore were acceptable. The Cronbach alpha values for study variables that include project planning, capacity building, project implementation, monitoring & evaluation being the independent variables and performance of tissue culture banana project being the dependent variable were greater than the recommended value of 0.7. Since all the variables measured showed a cronbach's alpha higher than 0.7, they were all reliable and thus accepted. Based on reliability results, the instrument was reliable and adequate for actual data collection. The detailed reliability test results are shown in Appendix VI.

3.6 Data Collection Procedure

Data collection involves applying procedures to extract the relevant responses from participants in a study. Following the approval of the research proposal by University

of Nairobi(UoN), it was possible to undertake data collection. The researcher went further to seek a permit from NACOSTI. Letter of authorization was issued by UoN and the researcher first obtained a permit to gather data from County Government of Vihiga through the County Secretary.

After obtaining consent to visit the targeted respondents for the collection of the required data, the researcher utilized four research assistants to help in the exercise of gathering data since this ensured, expeditious and effective data collection by the assistants who were trained first in order, to have a better appreciation of the tools, goals of the research and ethical issues involved. The researcher in conjunction with four research assistants gave out questionnaires to the respondents on one on one basis so that, they had ample time to explain to them what would be required of the latter and the relevant information expected. Data collection took a period of 2 weeks. The respondents were provided ample time to read, comprehend and fill in the necessary data at their own convenience. The completed questionnaires were then compiled in preparation for data analysis.

3.7 Data Analysis Technique

According to Cameron, Sankaran, and Scales (2015), data scrutiny is the process of obtaining, producing, and modifying information sequentially to highlight vital knowledge, signify inferences, and promote decision-making (2015). Examining the information acquired during a study that led to a conclusion and judgment was among the research processes.

Descriptive statistics was employed in analyzing data which was later presented in tabular form where percentages, means, and SDev were established. Specifically, means were used to measure central tendency and SD for variability or dispersion. A composite mean calculated on each variable was used to make interpretation on each of the line item mean as per the responses given by the respondents so as to draw conclusion. Where the line item mean was lower in comparison to composite/average mean, the results implied that the statement had no positive influence on dependent variable and vice versa. The findings were presented in tables and then interpreted.

To establish the association or correlation between independent variable (IV) and dependent variable (DV), Pearson Product Moment was employed. In this case, results were interpreted using coefficient of correlation r . When the value of r is +1 then there is a perfect positive correlation whereas a negative (-1) value implies perfect negative association. Thus, 0.000 means no correlation; 0.251 to 0.500 is a semi-strong correlation; 0.501 to 0.750 is a strong correlation; and 0.751 to 1.000 is a very strong correlation.

Regression analysis was fit for this study for purposes of testing hypotheses. This was done through ANOVA. The model for analysis was represented in a linear equation form. To make conclusion from regression analysis, coefficient of determination R-squared (R^2) from the model summary was used for simple line regression for the first four objectives of the study. The adjusted R-squared (adjusted R^2) was used on the multiple linear regression of the fifth objectives. In addition, the good of fit for each regression model was established from the ANOVA by comparing the critical value and the calculated F-statistic. According to Gwet (2014), regression analysis is a statistical model applied in establishing the nature as well as magnitude of association amongst the variables and to testing the hypothesized relationships in a given study. To test linear relationships amongst individual predictor variables and the dependent variable each individual independent variable had unique model as follows:

$$Y = \beta_0 + \beta_1 X_1 + \epsilon \dots \dots \dots \text{Model1}$$

$$Y = \beta_0 + \beta_2 X_2 + \epsilon \dots \dots \dots \text{Model2}$$

$$Y = \beta_0 + \beta_3 X_3 + \epsilon \dots \dots \dots \text{Model3}$$

$$Y = \beta_0 + \beta_4 X_4 + \epsilon \dots \dots \dots \text{Model4}$$

The model for project management practices (four independent variables combined) was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \dots \dots \text{Model5}$$

The linear regression analysis allowed for the determination of the constant value, coefficient (β_0) and the coefficients slope (β) from the data. The research hypothesis was undertaken at 95% confidence level using t-test. If the obtained p value is below or equivalent to alpha ($\alpha \leq 0.05$), the null hypothesis was rejected in favor of an alternate hypothesis (McLeod, 2019). The analyzed data was presented in tables. A summary of statistical test of hypotheses which includes the regression models was thus given (Table 3.4).

Table 3.4: Summary of Statistical Test of Hypotheses

Objective	Hypothesis	Statistical Analysis	Model	Level of Acceptance/Rejection
1. To assess the influence of project planning on performance of tissue culture banana in Hamisi Sub-County.	H_0 : Project planning has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.	Simple Linear regression	$Y = \beta_0 + \beta_1 X_1 + \varepsilon$	When $P \leq 0.05$, reject H_0 in favor of H_1
2. To establish the influence of capacity building on performance of tissue culture banana in Hamisi Sub-County.	H_0 : Capacity building has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.	Simple Linear regression	$Y = \beta_0 + \beta_2 X_2 + \varepsilon$	When $P \leq 0.05$, reject H_0 in favor of H_1
3. To examine the influence of project implementation on performance of tissue culture banana in Hamisi Sub-County.	H_0 : project implementation has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.	Simple Linear regression	$Y = \beta_0 + \beta_2 X_2 + \varepsilon$	When $P \leq 0.05$, reject H_0 in favor of H_1
4. To determine the influence of M and E on performance of tissue culture banana in Hamisi Sub-County.	H_0 : M and E of project has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.	Simple Linear regression	$Y = \beta_0 + \beta_4 X_4 + \varepsilon$	When $P \leq 0.05$, reject H_0 in favor of H_1
5. To evaluate the influence of combined project management practices on performance of tissue culture banana in Hamisi Sub-County.	H_0 : Combined project management practices have no significant relationship with performance of tissue culture banana in Hamisi Sub-County.	Multiple Linear regression	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$	When $P \leq 0.05$, reject H_0 in favor of H_1

3.8 Ethical considerations

Consent and confidentiality were two key considerations that were adhered to during the research process. A university letter was sought from the department prior to applying for

official letter from NACOSTI. It was also fundamental to obtain clearance from the NARIGP to be able to get the exact participants or target population.

The study was based on all pertinent information, including its purpose and objective. The explanation of these aspects helped the participants comprehend their contribution to the accomplishment of this research. The voluntary nature of research was made clear to the respondents. By keeping the participants' names and other private information anonymous, the anonymity of the participants was safeguarded. Only information that was pertinent to addressing the study questions was included. The study followed the University of Nairobi's policy on plagiarism, which entails using another person's ideas or works and passing them off as one's (UoN, 2013). The greatest effort was made to properly credit works drawn from other researchers and diverse data sources using references.

3.9 Operationalization of Variables

This is captured in Table 3.5. It outlines the measurement scales for each variable being studied, the methodological approach that was adopted, the kind of data analysis that was done, and the procedure used to analyze each variable.

Table 3.5: Operationalization of the variables

Objectives	Variable	Indicators	Measurement Scale	Research Approach	Type of Data Analysis	Tools of Analysis
To examine the influence of project planning on performance of tissue culture banana.	Project planning (Independent)	- Stakeholder engagement - Project extension activities - Feasibility study	Ordinal Interval	Quantitative Qualitative	Descriptive Inferential	Frequencies, percentages, mean and standard deviation Pearson correlation and simple linear regression (ANOVA)
To establish the influence of capacity building on performance of tissue culture banana in Hamisi Sub-County.	Capacity building (Independent)	-Farmer training -Technical Assistance to farmers' CBO's -Mentorship	Ordinal Interval	Structured interview schedule	Descriptive Inferential	Frequencies, percentages, mean and standard deviation Pearson correlation and simple linear regression (ANOVA)
To examine the influence of project implementation on performance of tissue culture banana in Hamisi Sub-County.	Project implementation (Independent)	-Assembling of planting material -Crop management -Work breakdown structure	Ordinal Interval	Quantitative Qualitative	Descriptive Inferential	Frequencies, percentages, mean and standard deviation Pearson correlation and simple linear regression (ANOVA)

Objectives	Variable	Indicators	Measurement Scale	Research Approach	Type of Data Analysis	Tools of Analysis
To determine the influence of monitoring and evaluation on performance of tissue culture banana in Hamisi Sub-County.	Monitoring and evaluation (Independent)	Goals and objectives Budget compliance Cost management	Ordinal Interval	Quantitative Qualitative	Descriptive Inferential	Frequencies, percentages, mean and standard deviation Pearson correlation and simple linear regression (ANOVA)
To evaluate the influence of combined project management practices on performance of tissue culture banana in Hamisi Sub-County.	Combined project management practices (independent)	- Project planning -Capacity building -Project implementation -Project M&E	Ordinal Interval	Quantitative Qualitative	Descriptive Inferential	Frequencies, percentages, mean and standard deviation Pearson correlation and Multiple linear regression (ANOVA)
	Project Performance (Dependent)	-Jobs creation -Quality of farm produce -Household Income	Ordinal Interval	Quantitative Qualitative	Descriptive	Frequencies, percentages, mean and standard deviation

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

The chapter presents the return rate and the demographic results. It covers the descriptive results. Correlation between variables was performed to determine the link between the independent variable and dependent variables. Multiple regressions were also undertaken to determine the relationship between variables under study. The variables were project planning, capacity building, project implementation and M and E the dependent variable of was performance of tissue banana culture of national agricultural rural inclusive growth project.

4.1 Questionnaire response rate

A total of 170 questionnaires were distributed to participants out of which 143 questionnaires were duly filled and reverted.

Table 4.1: Response Rate

Category of Respondents	Sample Size	Returned	Unreturned	Return rate (%)
Banana project beneficiaries	163	136	25	80.0%
NARGIP staff members	7	7	-	4.1%
Total	170	143	24	84.1%

From Table 4.1, out of 163 questionnaires issued to banana project beneficiaries, 136 were filled properly and reverted being 80.0% response rate hence satisfactory enough for a viable study. All the (7) NARGIP staff members participated in the study. According to Ali et al, (2021), an average return rate of 54.4 percent is satisfactory. Thus, response rate of 84.1 percent for banana project beneficiaries and NARGIP staff members is very good for the study. Higher return rate is as a result of early notification sent to participants, and compliance with ethics including request consent and maintain confidentiality of gathered data.

4.2 Demographic information of respondents

The section consists of biodata of participants that include age, gender, educational level, size of land and ownership of land.

4.2.1 Gender of the respondents

Table 4.2 represents the gender, age and level of education of those who took part. It captures the number of respondents in each category based on gender and age.

Table 4.2: Demographic information of respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent	Cumulative Percent
Male	90	62.9	62.9	62.9	100
Female	53	37.1	37.1	100	
Total	143	100	100		
Age	Frequency	Percent	Valid Percent	Cumulative Percent	
Below 30yrs	26	18.2	18.2	18.2	
31-40	42	29.4	29.4	47.6	
41-50	43	30.1	30.1	77.7	
Over 50 yrs.	32	22.4	22.4	100	
Total	143	100	100		
Highest Level of Education	Frequency	Percent	Valid Percent	Cumulative Percent	
Primary	27	18.9	18.9	18.9	
Secondary	37	25.9	25.9	44.8	
Certificate	38	26.6	26.6	71.3	
Diploma	24	16.8	16.8	88.1	
Degree	16	11.2	11.2	99.3	
Other	1	0.7	0.7	100	
Total	143	100	100		
Ownership	Frequency	Percent	Valid Percent	Cumulative Percent	
Fully own	26	18.2	18.2	18.2	
Other	117	81.8	81.8	100	
Total	143	100	100		
Category of land owned	Frequency	percent	Valid Percent	Cumulative Percent	
Family	45	63.4	63.4	63.4	
Rental	26	36.6	36.6	100	
Total	71		100		
	Minimum	Maximum	Mean	Std. Deviation	
Size of land in acres	0.1	11	3.12	2.5549	

From the results in Table 4.2, 63% of participants were male while Female were 37%. This means that a majority of men in Hamisi Vihiga County are engaged in Tissue culture banana farming as compared to women. The results concur with the research conducted by Rietveld and Farnworth (2018) on gender-receptive banana research for development in Eastern Africa Highlands who found out that more males (63%) took part in banana production than females (37%). The study reveals that men are more likely to take part in the management of banana farming and the women majorly provide labour. The findings resonate with Mushori (2017) who argued that women in Africa are hindered by patriarchal system that makes it difficult for them to access property rights including land and credit facility.

The results further unveil that majority of those involved in the tissue culture banana farming are between 31 and 50 years. The results are in tandem with the findings of Wanjiru (2010), who spatially analyzed constraints as well as opportunities in banana value chain in Meru, Kenya, and found out in her study an average mean age of banana farmers as 47 years and age range of 16 to 88 years.

The lowest education level is primary level and the highest is labeled other and includes any educational attainment beyond the first degree. From results presented in Table 4.2, the level of education for most farmers involved in Tissue culture banana farming is the secondary and certificate levels of education. Significant number of farmers also had attained primary and diploma level. The educational level of participants was also analyzed. Most farmers involved in Tissue culture banana farming is the secondary and certificate levels of education. Significant number of farmers also had attained primary and diploma education. According to Wahome *et al.* (2021) trends in banana production, cultivar diversity, and technologies of tissue culture uptake in Kenya, majority of farmers have at least primary education. It is thought that farmers with formal education are better able to understand and react to new information and technologies. Formal education also boosts the level of awareness of trends and decision-making.

This research investigated the ownership of land used in the Tissue culture banana farming. The findings in Table 4.2 indicate that 82% of arable land is fully owned by the individual farmers while 18% of the farmers do not own the land. Majority of these lands

are inherited. After land subdivision, the ownership is transferred to individuals whereby others have titles, others do not.

The participants indicated the nature of ownership of land that they were using in the Tissue culture banana farming. For those who were not the owners of the lands, they were to specify the ownership status. From the results above, 63% of the lands not owned by the farmers was family land. The rights of the land were vested under a single head of the family. Further, 37% of the lands not fully owned were from lease agreements mostly long term leases.

The study investigated the size of land used by the farmers for Tissue culture banana farming. The results presented in Table 4.2 showed a minimum of 0.1acres and a maximum of 11 acres from the sample farmers selected. The average size of land from this sample is 3.12 acres. The decrease in arable land has been due to subdivision of land and increasing population.

4.3 Performance of Tissue culture banana Projects

The research purposed to unveil the performance of tissue culture banana farming in Hamisi sub-county, Vihiga County. The respondents of the research included the tissue culture banana farmers and the officials of NARIGP in Hamisi Sub County, Vihiga County, Kenya.

Table 4.3: Descriptive Statistics of Performance of Tissue culture banana

	SD	D	N	A	SA	M	S Dev
	f	f	f	f	f		
	%	%	%	%	%		
Job creation							
PP1 Farming of Tissue Culture Banana has led to job creation among the families.	13 9.1%	14 9.7%	19 13.3%	54 37.8%	43 30.1%	3.70	1.251
PP2 During COVID 19 the crop was the main source of livelihood.	17 11.9%	12 8.3%	19 13.3%	59 41.3%	36 25.2%	3.59	1.280
PP3 The crop has brought employment among the youth	15 10.5%	15 10.4%	14 9.8%	64 44.8%	35 24.5%	3.62	1.255
Quality of Farm Produce							
PP4 Farmers have realized that Tissue Culture Banana produce	20 14.0%	24 16.7%	5 3.5%	48 33.6%	46 32.2%		

	SD	D	N	A	SA	M	S Dev	
have a higher quality than the traditional ones						3.53	1.443	
PP5 Farmers' produce are marketable in the other Counties	17 11.8%	13 9.1%	12 8.4%	60 42.0%	41 28.7%	3.66	1.305	
PP6 Quality of the crop has led to higher yields.	17 11.9%	11 7.6%	12 8.4%	56 39.2%	47 32.9%	3.73	1.316	
Household income								
PP7 Farmers are able to meet household's basic needs.	13 9.1%	19 13.2%	14 9.8%	62 43.4%	35 24.5%	3.61	1.245	
PP8 Farmers are able to save	18 12.5%	14 9.8%	20 14.0%	52 36.4%	39 27.3%	3.56	1.325	
PP9 Farmers are able to educate their children.	15 10.5%	12 8.3%	15 10.5%	59 41.3%	42 29.4%	3.71	1.266	
Composite mean and SDev						3.64	1.298	

Table 4.3 present analysis of performance of tissue culture banana. A composite mean and SDev were calculated while a line item mean and SDev were utilized to make comparison. A line item having a mean higher than composite mean, implied the item had a positive influence and vice versa. This also applied to the interpretation of results on standard deviation and composite standard deviation.

Statement PP1, farming of tissue culture banana has led to job creation among the families, 43(30.1%) strongly agreed and 54(37.8%) agreed whereas 19(13.3%) held neutral stand. The line item recorded a mean of 3.70 higher than composite mean of 3.64. The results imply that farming of tissue culture banana has led to job creation among the families in Hamisi Sub County, Vihiga County. A line item SD was 1.251 lower than the composite SDev of 1.298 indicating the opinions were converging. The results concur with Mungania (2010) who studied contributions from tissue culture bananas on livelihoods of the people in Abogeta East, Imenti and found that tissue culture bananas has led to increased income due to sales of tissue culture Bananas and employment in the tissue culture Bananas farms. Banana farming is a form of income source for most of the inhabitants.

Statement PP2, during COVID 19 the crop was the main source of livelihood, 36(25.2%) strongly agreed and 59(41.3%) agreed whereas 19(13.3%) held neutral stand. The line item had mean of 3.59 higher than composite mean of 3.64. The results imply that during

COVID 19 the crop was the main source of livelihood in Hamisi Sub County, Vihiga County. A line item SDev was 1.280 lower than the composite SDev of 1.298 indicating the opinions were converging. Ouko et al, (2020) studied on effects of Covid-19 on household livelihoods and food security in Kenya found out that agriculture remain as the key source of livelihoods for most rural households. Many rural households in Hamisi sub county depended on Tissue culture banana farming during Covid 19 period.

Statement PP3, the crop has brought employment among the youth, 35(24.5%) strongly agreed and 64(44.8%) agreed whereas 14(9.8%) held neutral stand. The line item recorded a mean of 3.62 higher than composite mean of 3.64. The results imply that during COVID 19 the crop was the main source of livelihood in Hamisi Sub County, Vihiga County. A line item SD was 1.255 lower than the composite SDev of 1.298 indicating the opinions were converging. The results concur with Mungania (2010) who studied contribution of tissue culture Bananas on livelihoods of the people in Abogeta, Imenti and found that tissue culture Bananas has led to increased income as a result of sales of tissue culture Bananas and employment in the tissue culture Bananas farms. Most youth in Hamisi Sub County are engaged in Tissue culture banana farming as a source of employment.

Statement PP4, farmers have realized that Tissue Culture Banana produce have a higher quality than the traditional ones, 46(32.2%) strongly agreed and 48(33.6%) agreed whereas 5(3.5%) held neutral stand. The statement had a mean of 3.53 higher than the composite mean of 3.64. The results imply that farmers have realized that Tissue Culture Banana produce have a higher quality than the traditional ones. A line item SD was 1.443 higher than composite SDev of 1.298 indicative of divergent opinions.

Bananas grown through tissue culture did better than those grown through traditional methods as per all economic variables, with an average profit gained from tissue cultured banana reaching 591% higher than profit gained from traditionally planted bananas. Khaled et al. (2010) unveiled on impact of tissue culture banana on economic return per Fedden in Egypt. Moreover, it was shown that tissue cultured bananas are superior in terms of flavor, appearance, and nutritional content, as well as yielding a crop free of viral infections. *“Tissue culture projects in this sub-county have been doing very well so*

far. Most of the farmers have adopted it and has provided a source of living for them. Its yields are higher than the indigenous breed.” One of the farmers in an interview is quoted saying.

Statement PP5, the farmers’ produce is marketable in the other Counties, 41(28.7%) strongly agreed and 60(42.0%) agreed whereas 12(8.4%) held neutral stand. The statement had a line item mean of 3.66 higher than the composite mean of 3.64. The results imply that farmers’ produce are marketable in the other Counties. A line item SD was 1.305 higher than composite SDev of 1.298 indicative of divergent views. The results concur with a study by Rao et al, (2015) on a situational analysis in Western Kenya which showed that bananas are primarily consumed locally, with limited export to other districts. Nevertheless, compared to what is consumed by households, a greater percentage is sold for cash.

Statement PP6, the Quality of the crop has led to higher yields, 47(32.9%) strongly agreed and 56(39.2%) agreed whereas 12(8.4%) held neutral stand. The line item recorded a mean of 3.73 higher than composite mean of 3.64. The results imply that the Quality of the crop has led to higher yields. A line item SD was 1.316 higher than composite SDev of 1.298 indicative of divergent views. The results corroborate Wittkop et al. (2009) on the status and future prospects of breeding for improved yield and quality of oilseed crops in Europe which showed that a farmer's crop yield and seed quality match most of the time. this is because high-quality seeds are more physiologically pure than other seed varieties and are typically devoid of seed-borne illnesses, high-quality banana seedlings are guaranteed to deliver excellent yields.

Statement PP6, the farmers are able to meet household’s basic needs, 35(24.5%) strongly agreed and 62(43.4%) agreed whereas 14(9.8%) held neutral stand. The line item recorded a mean of 3.61 lower than composite mean of 3.64. The results imply that the Farmers are unable to meet all the household’s basic needs. A line item SD was 1.245 lower than the composite SDev of 1.298 indicating the opinions were convergent. Obaga and Mwaura (2018) on effect of farmers' involvement in banana value addition on household welfare in Kisii Central Sub-County, most respondents provided reading and

writing materials for their kids. Other respondents worked in factories, while the majority of respondents were self-employed.

Statement PP7, the farmers are able to save, 39(27.3%) strongly agreed and 52(36.4%) agreed whereas 20(14.0%) held neutral stand. The line item recorded a mean of 3.56 lower than composite mean of 3.64. The results imply that the Farmers are not able to save. A line item SD was 1.345 lower than the composite SDev of 1.298 indicating the opinions were convergent. Kabunga et al, (2014) in Kenya established that tissue culture banana farming adoption positively affects income and hence household savings.

Statement PP8, the farmers are able to educate their children, 42(29.4%) strongly agreed and 59(41.3%) agreed whereas 15(10.5%) held neutral stand. line item recorded a mean of 3.71 higher than composite mean of 3.64. The results imply that the Farmers are capable of taking their children to school. A line item SD was 1.266 lower than the composite SDev of 1.298 indicating the opinions were convergent. A study by Obebo and Omboki (2016) in Kisii Central Sub-County indicated that residents' socioeconomic lifestyles improve as a result of higher incomes and more options because they can access quality education, better health facilities, and improvement on their general wellbeing.

4.4 Project Planning and Performance of Tissue Culture Banana Projects.

This section presents descriptive and inferential which covers both correlational and regression analyses for the first objective.

4.4.1 Descriptive Statistics of Project planning Performance of Tissue Culture Banana Project

Participants were to show their agreement and, or disagreement on three variables: stakeholder engagement, project extension activities and feasibility study. A composite mean and SDev were calculated while a line item mean and SDev were utilized in making comparison. A line item with mean higher than the composite mean, implied the item had a positive influence and vice versa. This applied to the interpretation of results on standard deviation and composite standard deviation. Statements were measured using a 5 point Likert scale ranging from 5 = strongly agree, 4 = agree, 3 = Neutral, 2 = disagree and 1= strongly disagree.

Table 4.4: Descriptive Statistics of Project Planning and Performance of Tissue Culture Banana Project

	SD	D	N	AS	SA	M	SDev
	f	f	f	f	f		
	%	%	%	%	%		
PR01 Farmers participated in project budget planning	17 11.9%	18 12.5%	17 11.9%	48 33.6%	43 30.1%	3.57	1.350
PR02 The decision concerning seed selection was agreed upon by all the farmers.	13 9.0%	20 14.0%	15 10.5%	58 40.6%	37 25.9%	3.60	1.262
PR03 Farmers were part and parcel of project goals and objectives.	14 9.8%	13 9.0%	17 11.9%	62 43.4%	37 25.9%	3.66	1.233
PR04 Project extension activities were regularly conducted	19 13.2%	15 10.5%	12 8.4%	62 43.4%	35 24.5%	3.55	1.325
PR05 Farming activities were supported by extension services	14 9.8%	14 9.7%	20 14.0%	50 35.0%	45 31.5%	3.69	1.281
PR06 NARGIP team established demonstration sites among the CBOs' involved.	17 11.8%	17 11.9%	12 8.4%	55 38.5%	42 29.4%	3.62	1.337
PR07 The feasibility study revealed project viability among the households selected	7 4.9%	12 8.3%	8 5.6%	68 47.6%	48 33.6%	3.97	1.084
PR08 The household needs of individual farmers were prioritized in the feasibility study as part of project planning	15 10.4%	15 10.5%	16 11.2%	62 43.4%	35 24.5%	3.61	1.256
PR09 Social and environmental assessment was comprehensively conducted	16 11.2%	17 11.8%	18 12.6%	56 39.2%	36 25.2%	3.55	1.293
Composite mean						3.65	1.269

From Table 4.4, statement PR01, the farmers participated in project budget planning, 43(30.1%) strongly agreed and 48(33.6%) agreed whereas 17(11.9%) held neutral stand as shown above. The line item recorded mean of 3.57 lower than composite mean of 3.65. The results imply that there is no consensus on the farmer's participation in project budget planning. A line item SD was 1.350 higher than composite SDev of 1.269 indicating that the farmers had divergent views about the budget planning. A study by Abbott and Malunda, (2016) on the promise and the reality found out that when comparing government, NGOs, CSOs, and international agencies, local farmers utilized the term "citizen involvement" in a completely different context. An interview with a NARIGP official indicated "*Involving farmers in planning stages of the project helps in*

incorporating their ideas in the project and also increases the uptake of the tissue culture banana among the farmers”

Statement PR02, the decision concerning seed selection was agreed upon by all the farmers, 37(25.9%) strongly agreed and 58(40.6%) agreed whereas 15(10.5%) held neutral stand. The statement had a line item mean of 3.60 lower than the composite mean of 3.65. The results imply that the decision concerning seed selection was not agreed upon by all the farmers. A line item SD was 1.262 lower than the composite SDev of 1.269 indicating that the farmers had convergent opinions about the seed selection. Kilwinger et al. (2020) a Ugandan study revealed that there are differences in the methods that farmers use to pursue these objectives, which may be related to factors like gender, scale of production, and production targets. These variations in farmers' preferences for specific sources show that not only cultivar attributes, but also the characteristics of sources from which farmers obtain planting material, ought to be adapted to farmers' needs and preferences. An interview with a NARIGP official indicated *“Tissue culture banana is disease free. It does not take long for harvests to be realized and the quality of its fruits is high.”*

Statement PR03, the farmers were part of project goals and objectives, 37(25.9%) strongly agreed and 62(43.4%) agreed whereas 17(11.9%) held neutral stand. The line item recorded mean of 3.66 higher than composite mean of 3.65. The results imply that the Farmers were part of project goals and objectives. A line item SD was 1.233 lower than the composite SDev of 1.269 indicating that the farmers had convergent opinions with regards to the project goals and objectives. According to a research by Johnson et al. (2017) on how agricultural development projects try to empower women, articulating the project's goals is one of the most important project management steps. Developing project objectives allows for the measurement of their accomplishment as well as the identification of major external risks that may obstruct their accomplishment successibility. A session with a NARIGP official indicated *“Involving the farmers right from the onset of the projects makes the management of the project simpler. The farmers will be able to do most of the things on their own.”*

Statement PR04, the project extension activities were regularly conducted, 35(24.5%) strongly agreed and 62(43.4%) agreed whereas 12(8.4%) held neutral stand. The line item recorded mean of 3.55 lower than composite mean of 3.65. The results imply that the Project extension activities were not regularly conducted. A line item SD was 1.325 higher than composite SDev of 1.269 inferring that farmers had divergent opinions about the project goals and objectives. A study by Nisha, (2006) on Understanding extension education, extension services, hence, gives crucial tactics needed by farmers in improving their productivity. An interview with one of the tissue culture banana farmers indicated *“We receive extension services whenever we need. However, most of the activities we do on our own and involve the NARIGP officials whenever it is extremely necessary.”*

Statement PR05, the farming activities were supported by extension services, 45(31.5%) strongly agreed and 50(35.0%) agreed whereas 20(14.0%) held neutral stand. The line item recorded mean of 3.69 higher than composite mean of 3.65. The results imply that the Farming activities were supported by extension services. A line item SD was 1.281 higher than composite SDev of 1.269 inferring that farmers had divergent opinions with regards to the farming activities being supported by extension services. A study by Karbasioun et al, (2007) in Esfahan, Iran on extension services revealed that the importance of agricultural extension services and the need for greater involvement in agricultural extension services. An interview with one of the tissue culture banana farmers indicated *“We receive extension services whenever we need. However, most of the activities we do on our own and involve the NARIGP officials whenever it is extremely necessary.”*

Statement PR06, the NARGIP team established demonstration sites among the CBOs' involved, 42(29.4%) strongly agreed and 55(38.5%) agreed whereas 12(8.4%) held neutral stand. The statement had a line item mean of 3.62 lower than composite mean of 3.65. The results imply that the NARGIP team did not establish enough demonstration sites among the CBOs' involved. A line item SD was 1.337 higher than composite SDev of 1.269 indicating that the farmers had divergent opinions concerning the establishment of demonstration sites by NARGIP. A research by Asfaw et al, (2016) in Ethiopia revealed that demonstration sites promote and disseminate information and knowledge to

the end user there to boost production and productivity. An interview with a NARIGP official indicated *“During trainings, demonstrations are done on all the farming activities involving the tissue culture banana. Farmers understand better where demonstrated”*

Statement PR07, the feasibility study revealed project viability among the households selected, 48(33.6%) strongly agreed and 68(47.6%) agreed whereas 8(5.6%) held neutral stand. The line item recorded mean of 3.97 higher than composite mean of 3.65. The results imply that the feasibility study revealed project viability among the households selected. A line item SD was 1.084 higher than composite SDev of 1.269 indicating that the farmers had convergent opinions with regards to the project goals and objectives. A study by Abdelmajeed and Aboul-Nasr, (2013) in Egypt and the results show that the net present benefit was positive and profitable of the banana tissue culture commercial production. In an interview with one of the farmers he had this to say *“Tissue culture banana project planning has helped in the long run to figure out the possible markets of our banana proceeds. Planning has also been efficient with regards to mitigating risks of project failure and enhancing the quality of the proceeds”*

Statement PR08, the household needs of individual farmers were prioritized in the feasibility study as part of project planning, 35(24.5%) strongly agreed and 62(43.4%) agreed whereas 16(11.2%) held neutral stand. The line item recorded mean of 3.61 lower than composite mean of 3.65. The results imply that not all the household needs of individual farmers were prioritized in the feasibility study as part of project planning. A line item SD was 1.256 lower than the composite SDev of 1.269 indicating that the farmers had divergent opinions concerning the prioritization of household needs for the individual farmers. A research study done by Kabunga et al, (2014) in Kenya indicate that uptake of tissue culture banana boosts farm as well as household income and hence the household are able to meet the household needs. An interview with a NARIGP official indicated *“When we do a feasibility study all the findings are taken into account during the implementation of the project. This helps in increasing the success rate of the project”*

Statement PR09, the social and environmental assessment was comprehensively conducted, 36(25.2%) strongly agreed and 56(39.2%) agreed whereas 18(12.6%) held neutral stand. The statement had a line item mean of 3.55 lower than composite mean of 3.65. The results imply that the social and environmental assessment was comprehensively conducted. A line item SD was 1.293 higher than composite SDev of 1.269 indicating that the farmers had convergent opinions about the conduct of social and environmental assessment. A research study done by Kassim, (2009) in Kisii and South Nyanza, Kenya indicate that Tissue culture banana farming has improved the livelihoods of households in the areas it was adopted as funds were available to take care of family's financial needs. An interview with a NARIGP official regarding the environmental assessment indicated *“Before the project is implemented, the social and environmental impact is assessed. If it will have a negative impact, the project cannot be implemented.”*

4.4.2 Correlation between Project planning and Performance of Tissue Culture Banana Farming

Analysis to determine the direction and magnitude of the association between the project planning (independent variable) and performance of tissue culture banana farming (dependent variable) was conducted.

The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 implied perfect positive correlation, while -1 implied perfect negative correlation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied moderately-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied very strong correlation.

Table 4.5 Correlation analysis between project planning and performance of tissue culture banana farming

		Performance of Tissue Culture	Project of Planning
Performance of Tissue Culture	Pearson Correlation	1	0.764**
	Sig. (2-tailed)		0.000
	n	143	143
Project of Planning	Pearson Correlation	0.764**	1
	Sig. (2-tailed)	0.000	
	n	143	143

** Correlation is significant at the 0.01 level (2-tailed).

As shown by Table 4.5, the results indicated there existed a very strong positive association between performance of tissue culture banana project and project planning ($r=0.764$) and the association is significant ($p=0.000<0.05$). Project planning is a stage where the problem is identified, objectives are set forth to attain the target results, alternative development and finally the choices made. The results are in with Naeem, *et al.* (2018) who contend that adopting project planning in early stages of a project have an impact on overall project performance.

4.4.3 Regression Analysis of project planning and performance of tissue culture banana farming

Simple linear regression analysis was undertaken to assess the association between the predictor and the outcome variable.

Hypothesis Testing

Simple regression model was utilized in testing the hypothesis

H₀: Project planning has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁: Project planning has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

Regression Model

The null hypothesis was tested by the model below:

$$Y = B_0 + B_1X_1 + \varepsilon$$

Where

Y = Performance of Tissue culture banana project

X_1 = Project Planning

B_0 = Constant term

B_1 = Beta coefficient

ε = Error term

Table 4.6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.764a	0.583	0.581	0.51855

a Predictors: (Constant), Project planning

From the results shown in Table 4.6, it is evident that project planning is a vital aspect in the performance of Tissue culture banana farming. This is sustained by the coefficient of determination termed as R-Square of 0.583. Implying that project planning explains 58.3% of the total variations in dependent variable which is the performance of Tissue culture banana farming.

Table 4.7: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	53.108	1	53.108	197.5	0.000b
Residual	37.915	141	0.269		
Total	91.022	142			

a Dependent Variable: Performance of Tissue Culture banana

b Predictors: (Constant), Project Planning

The significance of the model was tested using two tail approach as shown above. The findings in Table 4.7 means that the overall model is statistically significant. Findings also show that project planning is a vital element in the performance of tissue culture banana farming. The results were supported by an F value of 197.5 which is greater than the F critical value of 3.90 ($F_{1, 141}$). The reported P-value of 0.00 which is lesser than the conventional p-value of 0.05. The regression of coefficient results is presented in Table 4.8.

Table 4.8: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.711	0.213		3.345	0.001
Project Planning	0.816	0.058	0.764	14.053	0.000

Regression Model.

$$Y = .711 + .816X$$

Where

Y= Performance of tissue culture banana farming

X=Project planning

As shown in Table 4.8, the coefficient of the model is positive implying that project planning is not the only factor that affects the performance of tissue culture banana farming. Hence, even in the absence of project planning as a tool, other factors may come to play and finally get positive yields.

The regression analysis show that project planning and performance of tissue culture banana farming have a positive and significant relationship ($\beta=0.816$, $p=0.000$). This means that a unit improvement in project planning will lead to an increase in 0.816 units of tissue culture banana performance. The null hypothesis was that project planning has no substantial link with performance of tissue culture banana in Hamisi Sub-County. From the results, p value of $0.000 < 0.05$. Thus, the null hypothesis was rejected and the conclusion made that Project planning bear a substantial impact in the performance of tissue culture banana farming in Hamisi Vihiga County. In an interview with one of the farmers he had this to say “*Tissue culture banana project planning has helped in the long run to figure out the possible markets of our banana proceeds. Planning has also been efficient with regards to mitigating risks of project failure and enhancing the quality of the proceeds*”

The results from the analysis done indicated that project planning is vital element in performance of the tissue culture project and that the two variables had positive and statistically significant relationship. The farmers were involved in the budget planning process and during the selection of seedlings for planting. The farmers were also given priority during feasibility studies. Generally, there was farmer engagement in the entire project planning process. Project planning is a stage where the problem is identified, objectives are laid down to achieve the target results, alternatives development and finally the choices made.

Project planning is a stage where the problem is identified, objectives are set forth to attain the target results, alternatives development and finally the choices made. The results presented in the analysis in this research are in tandem with the empirical works of other scholars. According to Naeem, et al (2018), adopting project planning in the early stages of a project may impact generally the performance of project. Muute and James (2019) conducted a study, also found out that project planning favourably and significantly contributes to performance of projects. On the contrary, Tesfaye, (2017) in their research concluded that planning practices are oblivious to human factor, that it is only time, cost, and risks that are positively associated with the project success.

4.5 Capacity building and Performance of Tissue Culture Banana Projects.

The section presents descriptive and inferential which covers both correlational and regression analyses for the second objective.

4.5.1 Capacity building descriptive statistics

Participants were to indicate their agreement and/ or disagreement with three variables: farmer Training, technical assistance to farmers' CBOs and mentorship. A composite mean and SDev were calculated and a line item mean as well as SDev utilized in making comparison. A line item having a mean higher than the composite mean, implied the item had a positive influence and vice versa. This also applied to the interpretation of results on standard deviation and composite standard deviation. The statements were measured using a 5 point Likert scale ranging from 5 = strongly agree, 4 = agree, 3 = Neutral, 2 = disagree and 1= strongly disagree.

The results of the study are presented in the Table 4.9.

Table 4.9: Descriptive statistics of Capacity building and Performance of Tissue Culture Banana Projects

	SD	D	N	A	SA	M	SDev
	f	%	f	%	f	%	
CB01 Farmers participated in project budget planning	9 6.2%	12 8.4%	18 12.6%	56 39.2%	48 33.6%	3.85	1.163
CB02 The decision concerning seed selection was agreed upon by all the farmers.	14 9.8%	19 13.2%	11 7.7%	55 38.5%	44 30.8%	3.67	1.304
CB03 Farmers were part and parcel of project goals and objectives.	14 9.7%	14 9.8%	14 9.8%	57 39.9%	44 30.8%	3.72	1.269
CB04 Project extension activities were regularly conducted	16 11.1%	12 8.4%	9 6.3%	46 32.2%	60 42.0%	3.85	1.348
CB05 Farming activities were supported by extension services	18 12.6%	17 11.8%	11 7.7%	56 39.2%	41 28.7%	3.59	1.349
CB06 Through extension services, farmers are able to make informed decision the new technology of farming.	15 10.5%	18 12.5%	17 11.9%	55 38.5%	38 26.6%	3.58	1.291
CB07 Farmers receive regularly support on marketing produce.	17 11.8%	16 11.2%	15 10.5%	49 34.3%	46 32.2%	3.64	1.351
CB08 Farmers are taken to educational tours	14 9.8%	13 9.0%	14 9.8%	52 36.4%	50 35.0%	3.78	1.286
CB09 The NARGIP project team holds regular farmer-exhibitions.	17 11.9%	8 5.5%	19 13.3%	62 43.4%	37 25.9%	3.66	1.257
Composite Mean						3.70	1.291

From Table 4.9, statement CB01, the farmers participated in project budget planning, 48(33.6%) strongly agreed and 56(39.2%) agreed whereas 18(12.6%) held neutral stand as shown above. The statement had a mean of 3.85 higher than composite mean of 3.70. The results imply that the Farmers participated in project budget planning. A line item SD was 1.163 lower than the composite SDev of 1.291 indicating that the farmers had conflicting opinions with regards to the conduct of social and environmental assessment. A study by Abbott and Malunda, (2016) on the promise and the reality found out that the aspect of citizen participation tend to have varied meaning for local farmers compared to that of CSOs, government, International Agencies and NGOs. An interview with a NARIGP official indicated “*Involving farmers in planning stages of the project helps in*

incorporating their ideas in the project and also increases the uptake of the tissue culture banana among the farmers”

Statement CB02, the decision concerning seed selection was agreed upon by all the farmers, 44(30.8%) strongly agreed and 55(38.5%) agreed whereas 11(7.7%) held neutral stand. The line item had mean of 3.67 lower than the composite mean of 3.70. The results imply that the decision concerning seed selection was not agreed upon by all the farmers. A line item SD was 1.304 lower than the composite SDev of 1.291 indicating that the farmers had convergent opinions about the agreement to the seed selection. Kilwinger et al. (2020) on perceptions of farmers' sources for banana planting in Uganda revealed that manner in which farmers chose methods for achieving set goals were varied and sometimes influenced by factors like production scale, gender, and expected outcomes. A session with a NARIGP official indicated *“The farmers are given the different varieties of seeds, their advantages and given freedom to choose. Choosing the seed for the farmers may not work well with them.”*

Statement CB03, the farmers were part and parcel of project goals and objectives, 44(30.8%) strongly agreed and 57(39.9%) agreed whereas 14(9.8%) held neutral stand. The statement recorded a mean of 3.72 higher than composite mean of 3.70. The results imply the Farmers were part of project goals and objectives. A line item SD was 1.269 lower than the composite SDev of 1.291 indicating that the farmers had convergent opinions about the farmers being part of the project objectives. A study Johnson et al. (2017) demonstrates the importance of clearly articulating project objectives as one of the major project management processes. Harris et al, (2001) in their study argued that participation of farmers in exhibitions leads to exchange for desirable farming characteristics between farmers. A session with a NARIGP official indicated *“Involving the farmers right from the onset of the projects makes the management of the project simpler. The farmers will be able to do most of the things on their own.”*

Statement CB04, project extension activities were regularly conducted, 60(42.0%) strongly agreed and 46(32.2%) agreed whereas 9(6.3%) held neutral stand. The statement had a mean of 3.85 higher than composite mean of 3.70. The results imply the project

extension activities were regularly conducted. A line item SD was 1.348 higher than the composite SDev of 1.291 indicating that the farmers had divergent opinions with regards to the conduct of the extension activities. A study by Nisha, (2006) on Understanding extension education, extension services, hence, gives crucial tactics needed by farmers in improving their productivity. An interview with one of the tissue culture banana farmers indicated *“We receive extension services whenever we need. However, most of the activities we do on our own and involve the NARIGP officials whenever it is extremely necessary.”*

Statement CB05, farming activities were supported by extension services, 41(28.7%) strongly agreed and 56(39.2%) agreed whereas 11(7.7%) held neutral stand. The statement had a mean of 3.59 lower than composite mean of 3.70. The results imply that not all farming activities were supported by extension services. A line item SD was 1.349 higher than the composite SDev of 1.291 inferring that farmers had conflicting opinions with regards to the support of farmer activities by the extension services. A study by Karbasioun et al, (2007) in Esfahan, Iran on extension services revealed that the importance of agricultural extension services and the need for greater involvement in agricultural extension services. An interview with one of the tissue culture banana farmers indicated *“We receive extension services whenever we need. However, most of the activities we do on our own and involve the NARIGP officials whenever it is extremely necessary.”*

Statement CB06, through extension services, farmers are able to make informed decision the new technology of farming, 38(26.6%) strongly agreed and 55(38.5%) agreed whereas 17(11.9%) held neutral stand. The statement had a mean of 3.58 lower than the composite mean of 3.70. The results imply that through extension services, farmers are not able to make informed decision the new technology of farming. A line item SD was 1.291 equal to the composite SDev of 1.291 indicating that the farmers were at bar regarding the decisions to be made on the new technology of farming from extension activities. Ninsiima, (2018) in his study pinpointed out the importance of extension services in tissue culture banana farming. According to Ninsiima, (2018) extension services are essential for connecting farmers to other players in the economy as well as

for exchanging knowledge, technologies, and agricultural information. A session with a NARIGP official indicated *“We give farmers adequate training on the activities necessary in tissue culture banana farming and the necessary technology to be adopted. From the experience we have, farmers have been able to adopt this knowledge in their farming.”*

Statement CB07, farmers receive regularly support on marketing produce, 46(32.2%) strongly agreed and 49(34.3%) agreed whereas 15(10.5%) held neutral stand. The statement had a mean of 3.64 lower than composite mean of 3.70. The results imply that not all Farmers receive regularly support on marketing produce. A line item SD was 1.351 higher than composite SDev of 1.291 indicating that the farmers had divergent opinions with regards to the support on market produce. Van der Waal, (2008) argued that developing a fair trade model offers farmers a chance to more opportunities, where they may take advantage of consistent contract volumes, get immediate access to export markets, and split upstream profits. An interview with a NARIGP official indicated *“We have ready buyers of the tissue culture banana. However, farmers are also free to market their produce elsewhere because as you understand, the essence is to have a competitive market.”*

Statement CB08, farmers are taken to educational tours, 50(35.0%) strongly agreed and 52(36.4%) agreed whereas 14(9.8%) held neutral stand. The line item had a mean of 3.78 higher than composite mean of 3.70. The results imply that farmers are taken to educational tours. A line item SD was 1.286 equal to the composite SDev of 1.291 indicating that the farmers were at bar on the issue of the educational tours. Bonisoli et al, (2019) postulated in their study that educational tours provide business and economic comparative performance data of tissue culture banana. In a session with one of the farmers, the information recorded is quoted *“The trainings we have been attending have equipped us with the skills of growing the tissue culture. The extension activities we been receiving have been instrumental in ensuring good health of the tissue culture banana”*

Statement CB09, the NARGIP project team holds regular farmer-exhibitions, 37(25.9%) strongly agreed and 62(43.4%) agreed whereas 19(13.3%) held neutral stand. The line

item recorded a mean of 3.66 lower than composite mean of 3.70. The results imply that NARGIP project team do not hold regular farmer-exhibitions. A line item SD was 1.257 lower than the composite SDev of 1.291 indicating that the farmers had convergent opinions with regards to NARGIP project team holding regular farmer-exhibitions. Harris et al, (2001) in their study argued that participation of farmers in exhibitions leads to exchange for desirable farming characteristics between farmers. A session with a NARIGP official indicated *“We give farmers adequate training on the activities necessary in tissue culture banana farming and the necessary technology to be adopted. From the experience we have, farmers have been able to adopt this knowledge in their farming.”*

4.5.2 Correlation between capacity building and Performance of Tissue Culture Banana Farming

Analysis to determine the direction as well as magnitude of association between the capacity building (independent variable) and performance of tissue culture banana farming (dependent variable) was conducted.

The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 implied perfect positive correlation, while -1 implied perfect negative correlation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied moderately-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied very strong correlation.

Table 4.10 Correlation analysis between capacity building and performance of tissue culture banana farming

		Performance of Tissue Culture	Capacity Building
Performance of Tissue Culture	Pearson Correlation	1	0.776**
	Sig. (2-tailed)		0.000
	n	143	143
Capacity Building	Pearson Correlation	0.776**	1
	Sig. (2-tailed)	0.000	
	n	143	143

** Correlation is significant at the 0.01 level (2-tailed).

Results shown in Table 4.10 indicate a very strong positive association between performance of tissue culture banana project and capacity building ($r=0.776$) and the correlation is significant ($p=0.000<0.05$). This study concurs with the empirical studies by other researchers. Omondi (2016) postulated that the training methodology and curriculum contents for a capacity building program are key contributors in project performance.

4.5.3 Regression Analysis of capacity building and performance of tissue culture banana farming

Simple linear regression analysis was performed to assess the link between the predictor and the outcome variable.

Hypothesis Testing

Simple regression model was utilized in testing the hypothesis

H₀: Capacity building has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁: Capacity building has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

Regression Model

The model used for testing the null hypothesis was as follows:

$$Y = B_0 + B_1X_1 + \varepsilon$$

Where

Y = Performance of Tissue culture banana project

X₁ = Capacity Building

B₀ = Constant term

B₁ = Beta coefficient

ε = Error term

Table 4.11: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.776a	0.602	0.599	0.5072

a. Predictors: (Constant), capacity building

The results in the Table 4.11 above indicate that capacity building is a very significant factor in the performance of Tissue culture banana farming. This is because the coefficient of determination is 0.602 meaning that Capacity building explains 60.2% of the total variations in the dependent variable that is the performance of Tissue culture banana farming. The ANOVA results are presented in Table 4.12.

Table 4.12: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	54.75	1	54.75	212.831	0.000b
Residual	36.272	141	0.257		
Total	91.022	142			

a Dependent Variable: Performance of Tissue Culture banana

b Predictors: (Constant), Capacity Building

The significance of the model above was tested using two tail approach. The results shown in Table 4.12 unveil that the model was statistically significant. This is indicated

by the reported P-Value of 0.000 which is less than the conventional P-Value of 0.05 and also the calculated F value of 212.831 is greater than the F critical value of 3.90 ($F_{1, 141}$) from the F table. Therefore, this means that Capacity building is an important factor determining the performance of Tissue culture banana farming. The regression of coefficient results is presented in Table 4.13.

Table 4.13: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.634	0.21		3.019	0.003
Capacity Building	0.815	0.056	0.776	14.589	0.000

Regression Model

$$Y = .634 + .815X$$

Where,

Y=Performance of tissue culture banana farming

X=Capacity building

The coefficient of the model is positive implying that Capacity building is not the only factor that affect the performance of tissue culture banana farming. Hence, even in the absence of capacity building as a tool, other factors may come to play and finally get positive yields.

Capacity building and performance of tissue culture banana farming enjoy a positive and substantial relationship ($\beta=0.815$, $p=0.000$). Therefore, a unit increase in capacity building will lead to an increase by 0.815 units in the performance of tissue culture banana. The null hypothesis was that Capacity building has no significant link with performance of tissue culture banana in Hamisi Sub-County. From the results, the P-value obtained of 0.000 is less than conventional p-value of 0.05. Hence, the null hypothesis was rejected and the conclusion made that capacity building is an important factor in the performance of tissue culture banana farming. Efficient capacity building

entail training of farmers on the project budgets, seed selection so that they understand the project. It also entails providing assistance including extension services and mentoring them by assisting in marketing the produce, providing educational tours and exhibitions.

Capacity building is an important tool used for managing as well as evaluating sustainability of projects. It may be used to bridge a gap between planning and data demand and usage. It is essential in long-term trainings whereby feedback from training is utilized to improve on tissue culture project. This study concurs with the empirical studies by other researchers. Omondi (2016) for instance postulated that the training methodology and curriculum of a capacity building programs are key contributors in project performance. He also concludes that capacity building helps to boost workers' experience. Koonyo (2017) also postulates that Capacity building has a positive influence in the overall project performance.

4.6 Project Implementation and Performance of Tissue Culture Banana Farming.

This section presents descriptive and inferential which covers both correlational and regression analyses for the third objective.

4.6.1 Descriptive statistics of Project implementation and performance of tissue culture banana projects

three variables were considered by researcher while gathering information on: assembling of planting material, crop management and work breakdown structure. A composite mean and SDev were computed whereby a line item mean and SDev were utilized for comparison. A line item with a mean higher than the composite mean, implied the item had a positive influence and vice versa. This also applied to the interpretation of results on standard deviation and composite standard deviation. The statements were then measured

using a 5 point Likert scale ranging from 5 = strongly agree, 4 = agree, 3 = Neutral, 2 = disagree and 1= strongly disagree.

Table 4.14: Descriptive statistics of Project implementation and performance of tissue culture banana projects

	SD	D	N	A	SA	M	SDev
	f	f	f	f	f		
	%	%	%	%	%		
PI01 Farmers were adequately equipped with seedbeds	20 14.0%	11 7.6%	11 7.7%	45 31.5%	56 39.2%	3.74	1.408
PI02 Farmers were initially supplied with sufficient seedlings.	16 11.1%	11 7.7%	16 11.2%	60 42.0%	40 28.0%	3.68	1.270
PI03 Farmers were supplied with all required fertilizers.	14 9.8%	18 12.5%	13 9.1%	57 39.9%	41 28.7%	3.65	1.285
PI04 The soil was tested for the right amount of contents	12 8.4%	14 9.7%	22 15.4%	48 33.6%	47 32.9%	3.73	1.251
PI05 Correct planting spacing was observed during the planting of the banana transplants.	15 10.4%	19 13.3%	10 7.0%	60 42.0%	39 27.3%	3.62	1.299
PI06 Crop protection against diseases was done at the right time	18 12.5%	12 8.4%	14 9.8%	54 37.8%	45 31.5%	3.67	1.336
PI07 Planting season is supervised by the NARIGP field support team.	19 13.2%	15 10.5%	15 10.5%	51 35.7%	43 30.1%	3.59	1.365
PI08 Farmers are aware of the harvesting season.	19 13.3%	12 8.3%	15 10.5%	54 37.8%	43 30.1%	3.63	1.346
PI09 Farmers are guided on harvesting techniques	13 9.1%	8 5.5%	21 14.7%	54 37.8%	47 32.9%	3.80	1.219
composite mean						3.68	1.309

From Table 4.14, Statement PI01, the farmers were adequately equipped with seedbeds, 56(39.2%) strongly agreed and 45(31.5%) agreed whereas 11(7.7%) held neutral stand as shown above. The statement recorded a mean of 3.74 higher than composite mean of 3.68. The results imply that the farmers were adequately equipped with seedbeds. A line item SD was 1.408 higher than composite SDev of 1.309 inferring that the farmers had conflicting opinions with regarding the equipment of farmers with seedbeds. deFeijter, (2015), explained the importance of seedlings in a seedbed including convenience, easy weed control, elimination of the problems of difficult soils and reduced field management costs. A session with a NARIGP official indicated “*The farmers are given the different varieties of planting materials, their advantages and given freedom to choose. Choosing the seed for the farmers may not work well with them.*”

Statement PI02, the farmers were initially supplied with sufficient seedlings, 40(28.0%) strongly agreed and 60(42.0%) agreed whereas 16(11.2%) held neutral stand. The statement recorded the mean of 3.68 equal to the composite mean of 3.68. The results imply that the Farmers had sufficient seedlings at the beginning of the project. A line item SD was 1.270 lower than the composite SDev of 1.309 indicating that the farmers had convergent opinions with regards to the availability of sufficient seedlings during the project implementation phase. These findings are complemented by a study by Mulugo et al, (2020) who argued that banana tissue culture developers and promoters should focus on banana varieties that are adaptable and acceptable to farmer environmental conditions. A session with a NARIGP official indicated *“The farmers are given the different varieties of planting materials, their advantages and given freedom to choose. Choosing the seed for the farmers may not work well with them.”*

Statement PI03, the farmers were supplied with all required fertilizers, 41(28.7%) strongly agreed and 57(39.9%) agreed whereas 13(9.1%) held neutral stand. The line item recorded mean of 3.65 lower than composite mean of 3.68. The results imply that the Farmers were not supplied with all required fertilizers. A line item SD was 1.85 lower than the composite SDev of 1.309 indicating that the farmers had convergent opinions with regards to the Farmers being supplied with all required fertilizers. Shuen et al, (2017) argued that a fertilizer information system for banana plantations has been established to assist farmers effectively in managing information for banana farms, both to improve quality of tissue culture banana and preserve the environment. A session with a NARIGP official indicated *“The farmers are given the different varieties of planting materials, their advantages and given freedom to choose. Choosing the seed for the farmers may not work well with them.”*

Statement PI04, the soil was tested for the right amount of contents, 47(32.9%) strongly agreed and 48(33.6%) agreed whereas 22(15.4%) held neutral stand. The statement recorded a mean of 3.73 higher than composite mean of 3.68. The results imply that the soil was tested for the right amount of contents. A line item SD was 1.251 lower than the composite SDev of 1.309 indicating that the farmers had convergent opinions with regards to the soil being tested for the right amount of contents. Armour and Lait, (2017)

in their study postulated that banana farmers can save on fertilizer costs and improve water quality by monitoring the Phosphorus levels in their soil through soil testing. A session with a NARIGP official indicated *“Before we roll out the project we test the soils to determine the varieties of the tissue culture bananas the can do well with the type of soil available.”*

Statement PI05, the correct planting spacing was observed during the planting of the banana transplants, 39(27.3%) strongly agreed and 60(42.0%) agreed whereas 10(7.0%) held neutral stand. The statement had a line item mean of 3.62 lower than the composite mean of 3.68. The results imply that the correct planting spacing was not observed during the planting of the banana transplants. A line item SD was 1.299 lower than the composite SDev of 1.309 indicating that the farmers had convergent opinions on that Correct planting spacing was observed during the planting of the banana transplants. Mustaffa and Kumar, (2012) in their study explained the importance of correct spacing that the total yield and returns may be increased per unit area by embracing closer spacing. Closer spacing diminishes growth of weed and offers protection against wind damage. An interview with a NARIGP official indicated *“During trainings, demonstrations are done on all the farming activities involving the tissue culture banana. Farmers understand better where demonstrated”*

Statement PI06, the crop protection against diseases was done at the right time, 45(31.5%) strongly agreed and 54(37.8%) agreed whereas 14(7.0%) held neutral stand. The statement had a mean of 3.67 lower than composite mean of 3.68. The results imply that the crop protection against diseases was done at the right time. A line item SD was 1.336 higher than composite SDev of 1.309 inferring that farmers had divergent views on that the crop protection against diseases was done at the right time. Muchuruza and Melchior, (2013) argued that tissue culture banana diseases cause food insecurity, malnutrition and loss of income. As a result, the government should recruit extension officers to educate and inform farmers about how the disease is managed and controlled, as well as how it spreads. A session with one of the tissue culture banana farmers indicated *“Incase the bananas are infested with a disease; we notify the NARIGP officials. Their action has been timely and the control effective if they are notified on time”*

Statement PI07, the planting season is supervised by the NARIGP field support team, 43(30.1%) strongly agreed and 51(35.7%) agreed whereas 15(10.5%) held neutral stand. The statement recorded a mean of 3.59 lower than composite mean of 3.68. The results imply that the Planting season was not supervised by the NARIGP field support team. A line item SD was 1.365 higher than composite SDev of 1.309 indicating that the farmers had divergent opinions on that the planting season is supervised by the NARIGP field support team. Maulu *et al.* (2021) in their study pinpointed the role of the government officials in the tissue culture banana farming. They argued that they provide programs that can offer a long-term remedy for poverty. It is important to adopt appropriate strategies while taking into account local market dynamics and farmer needs. An interview with a NARIGP official indicated “*During trainings, demonstrations are done on all the farming activities involving the tissue culture banana. Farmers understand better where demonstrated. During plantings most farmers are able to do it on their own. However, our team is also available for assistance when needed.*”

Statement PI08, the farmers are aware of the harvesting season, 43(30.1%) strongly agreed and 54(37.8%) agreed whereas 15(10.5%) held neutral stand. The statement had a mean of 3.63 lower than composite mean of 3.68. The results imply that the Farmers were not aware of the harvesting season. A line item SD was 1.346 higher than composite SDev of 1.309 inferring that farmers had divergent opinions on that the Farmers are aware of the harvesting season. Anunobi and Anunobi's (2017) study on enhancing accessibility of information by farmers in rural area through ICT-based extension information services found that information deployment for agricultural extension services was well received, with testimonials of success in areas of cost-effective delivery, simple and prompt access, and complete information to farmers. An interview with a NARIGP official indicated “*During trainings, demonstrations are done on all the farming activities involving the tissue culture banana. Farmers understand better where demonstrated. Farmers are trained on how to harvest and when to harvest.*”

Statement PI09, the farmers are guided on harvesting techniques, 47(32.9%) strongly agreed and 54(37.8%) agreed whereas 21(14.7%) held neutral stand. The statement had a mean of 3.80 higher than composite mean of 3.68. The results imply that the Farmers are

guided on harvesting techniques. A line item SD was 1.219 lower than the composite SDev of 1.309 indicating that the farmers had convergent opinions on that the Farmers are guided on harvesting techniques. A study by Ali et al, (2010) argues that Bananas are often picked by way of hand in a team of two people. One person chops the bunch, and the other person carries it away. A cane knife is utilized in cutting shallow cross in stem that faces the bunch. An interview with one of the tissue culture banana farmers revealed “*Assembling of planting materials is critical in ensuring the smooth running of the project. Having all the necessary materials effective project and enhance a good banana health because all the necessary inputs are in place.*”

4.6.2 Correlation between Project implementation and Performance of Tissue Culture Banana projects

Analysis to establish direction and magnitude of the association between the project implementation (independent variable) and performance of tissue culture banana farming (dependent variable) was conducted.

The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 implied perfect positive correlation, while -1 implied perfect negative correlation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied moderately-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied very strong correlation.

Table 4.15 Correlation analysis between Project implementation and performance of tissue culture banana projects

		Performance of Tissue Culture	Project Implementation
Performance of Tissue Culture	Pearson Correlation	1	0.812**
	Sig. (2-tailed)		0.000
	n	143	143
Project Implementation	Pearson Correlation	0.812**	1
	Sig. (2-tailed)	0.000	
	n	143	143

** Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 4.15, there exist a very strong positive correlation between performance of tissue culture banana project and project implementation ($r=0.812$) and the association is significant ($p=0.000<0.05$). This study concurs with other scholarly studies including a study by Fashina, *et al.* (2020) who argued that project implementation is significant and adds value as well as sustain the farmer deliver within the acceptable cost constraints.

4.6.3 Regression Analysis of project implementation and performance of tissue culture banana farming

Simple linear regression analysis was undertaken to assess the association between the predictor and the outcome variable.

Hypothesis Testing

Simple regression model was utilized in testing the hypothesis

H₀: Project implementation no has significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁: Project implementation has a significant relationship with performance of tissue culture banana in Hamisi Sub-County

Regression Model

The model used for testing the null hypothesis was as follows:

$$Y = B_0 + B_1X_1 + \varepsilon$$

Where

Y = Performance of Tissue culture banana project

X₁ = Project Implementation

B₀ = Constant term

B₁ = Beta coefficient

ε = Error term

Table 4.16: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.812a	0.659	0.657	0.46884

From the results shown in the Table 4.16, an R Square of 0.659 means that project implementation explains 65.9% of the total variations in dependent variable, which is the performance of tissue culture banana farming. This means that project implementation is a crucial factor in determining the performance of tissue culture banana farming in Hamisi sub county Vihiga County. The ANOVA results are presented in Table 4.17.

Table 4.17: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	60.029	1	60.029	273.093	0.000b
Residual	30.993	141	0.22		
Total	91.022	142			

a Dependent Variable: Performance of Tissue Culture Banana

b Predictors: (Constant), Project Implementation Mean

From the results in Table 4.17, the model is statistically significant. Significance of the model was tested using two tail approach. The model is statistically significant because, the reported p-value of 0.000 is less than the conventional p-value of 0.05. The significance of the model was tested using a two tail approach. The significance of the model is further supported by an F value calculated (273.093) which is greater than the F critical value of 3.90 ($F_{1, 141}$) from the F table. This means project implementation is a very important factor in the performance of tissue culture banana farming. The regression of coefficient results is shown in Table 4.18.

Table 4.18: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.485	0.195		2.492	0.014
Project implementation	0.856	0.052	0.812	16.526	0.000

Regression model

$$Y=0.485+.856X$$

Where,

Y=Performance of tissue culture banana

X=Project implementation

The coefficient of the model is positive implying that project implementation is not the only factor that affect the performance of tissue culture banana farming. Hence, even in the absence of project implementation as a tool, other factors may come to play and finally get positive yields.

From the results, project implementation and performance of tissue culture banana farming ($\beta=0.856$, $p=0.000$). A unit improvement in project implementation may result to an increase by 0.856 units in the performance of tissue culture banana. The null hypothesis was that project implementation has no substantial link with performance of tissue culture banana in Hamisi Sub-County. Results showed that the obtained p-value of

0.000 is less than the conventional p-value of .05. Therefore, the null hypothesis was rejected and the conclusion made that project implementation has a substantial impact in the performance of tissue culture banana farming.

Data analysis showed that project implementation is a significant factor in the performance of Tissue culture banana project. The results also show that project implementation and performance of tissue culture banana enjoy a positive and statistically substantial association. Project implementation covers equipping the farmers with adequate high quality seedlings that assures high yields. Fertilizers are also prided to farmers at affordable rates to manage costs. Soil testing and providing protection against diseases and pesticides. This is important as it improves the yields. This research goes hand in hand with other previous research by other scholars. Al-Hajj and Zraunig (2018) established that project implementation is an important ingredient that influences project success. According to Fashina, *et al.* (2020), project implementation is significant and adds value as well as sustain the farmer deliver within the acceptable cost constraints.

4.7 Monitoring and Evaluation and Performance of Tissue Culture Banana Projects.

This section presents descriptive and inferential which covers both correlational and regression analyses for the fourth objective.

4.7.1 Descriptive Statistics of Monitoring and Evaluation and performance of tissue culture banana projects

Questionnaires were utilized to gathered information on three variables: financial monitoring, regular data collection and data dissemination. A composite mean and SDev were calculated whereby a line item mean and SDev were utilized to make comparison. A line item with a mean higher than the composite mean, implied the item had a positive influence and vice versa. This also applied to the interpretation of results on standard deviation and composite standard deviation. The statements were measured

using a 5 point Likert scale ranging from 5 = strongly agree, 4 = agree, 3 = Neutral, 2 = disagree and 1= strongly disagree.

Table 4.19: Monitoring and Evaluation and performance of tissue culture banana projects

	SD	D	N	A	SA	M	SDev
	f	f	f	f	f		
	%	%	%	%	%		
ME01 Farmers participated in project budget planning	13 9.1%	8 5.5%	24 16.8%	54 37.8%	44 30.8%	3.76	1.212
ME02 CBOs' are accountable on the utilization of funds.	15 10.4%	21 14.7%	12 8.4%	35 24.5%	60 42.0%	3.73	1.405
ME03 Disbursement of financial support is fairly shared among the farmers.	18 12.5%	17 11.9%	8 5.6%	55 38.5%	45 31.5%	3.64	1.366
ME04 Farmers have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect).	21 14.6%	11 7.7%	12 8.4%	62 43.4%	37 25.9%	3.58	1.345
ME05 NARIGP receive regular farmers' reports to make timely decision about the crop.	17 11.9%	16 11.1%	19 13.3%	43 30.1%	48 33.6%	3.62	1.362
ME06 Farmers are capable to analyze and deduce from the data collected.	12 8.4%	11 7.6%	16 11.2%	56 39.2%	48 33.6%	3.82	1.220
ME07 NARIGP have easy platform for sharing and reporting field data.	19 13.2%	22 15.4%	9 6.3%	56 39.2%	37 25.9%	3.49	1.373
ME08 Regular meetings are conducted to deliberate on challenges experienced during growing of the crop.	11 7.7%	15 10.4%	18 12.6%	50 35.0%	49 34.3%	3.78	1.241
ME09 Farmers have access to all information so as to improve on cultivation of crop.	19 13.3%	17 11.8%	12 8.4%	55 38.5%	40 28.0%	3.56	1.362
Composite Mean						3.66	1.321

From Table 4.19, statement ME01, that the farmers participated in project budget planning, 44(30.8%) strongly agreed and 54(37.8%) agreed whereas 24(16.8%) held neutral stand as shown above. The line item had a mean of 3.76 higher than composite mean of 3.66. The results imply that the Farmers participated in project budget planning. A line item SD was 1.212 lower than the composite SDev of 1.321 indicating that the farmers had convergent opinions on that the Farmers participated in project budget planning. A study by Brown, (1980) on farm budgets indicate that farm budgets are

drawn up mostly for evaluation of the efficacy of a certain group, farmers or farms at a specific accounting period, usually one year. An interview with a NARIGP official indicated *“Involving farmers in planning stages of the project helps in incorporating their ideas in the project and also increases the uptake of the tissue culture banana among the farmers”*

Statement ME02, the CBOs’ are accountable on the utilization of funds, 60(42.0%) strongly agreed and 35(24.5%) agreed whereas 12(8.4%) held neutral stand. The line item had a mean of 3.73 higher than composite mean of 3.66. The results imply that the CBOs’ are accountable on the utilization of funds. A line item SD was 1.405 higher than composite SDev of 1.321 implying farmers had divergent opinions on that the CBOs’ are accountable on the utilization of funds. According to a study by Purnawan et al. (2021) results show that financial assistance was utilized by farmers to meet a variety of needs, including educational cost for their children, healthcare expenses, family savings, and asset improvement. Financial assistance is also used to help farmers increase their farming production. A session with one of the tissue culture farmers indicated *“The management of our community based organizations has been instrumental in the management of the funds allocated to tissue culture banana farming.”*

Statement ME03, the disbursement of financial support is fairly shared among the farmers, 45(31.5%) strongly agreed and 55(38.5%) agreed whereas 8(5.6%) held neutral stand. The statement recorded a mean of 3.64 lower than composite mean of 3.66. The results imply that the disbursement of financial support was not fairly shared among the farmers. A line item SD was 1.366 higher than composite SDev of 1.321 inferring that the farmers had divergent opinions on that the disbursement of financial support is fairly shared among the farmers. According to a study by Purnawan et al. (2021) results show that financial assistance was utilized by farmers to meet a variety of needs, including educational cost for their children, healthcare expenses, family savings, and asset improvement. Financial assistance is also used to help farmers increase their farming production. A session with one of the tissue culture farmers indicated *“The management of our community based organizations has been instrumental in the management of the*

funds allocated to tissue culture banana farming. The disbursement of these funds has been fair.”

Statement ME04, the farmers have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect), 37(25.9%) strongly agreed and 62(43.4%) agreed whereas 12(8.4%) held neutral stand. The statement had a mean of 3.58 lower than composite mean of 3.66. The results imply that the Farmers did not have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect). A line item SD was 1.345 higher than composite SDev of 1.321 implying farmers had divergent opinions on that the farmers have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect). Kairuz et al, (2007) did a study on Tools for gathering data and analysis and found out the following tools of data collection interviews, surveys and questionnaires. An interview with one of the NARIGP official indicated *“We supply the farmers with data collection tools that is ODK. However, the use of these tools has been challenging to some farmers.”*

Statement ME05, the NARIGP receive regular farmers’ reports to make timely decision about the crop, 48(33.6%) strongly agreed and 43(30.1%) agreed whereas 19(13.3%) held neutral stand. The statement recorded mean of 3.62 lower than composite mean of 3.66. The results imply that the NARIGP did not receive regular farmers’ reports to make timely decision about the crop. A line item SD was 1.362 higher than composite SDev of 1.321 implying farmers had divergent opinions on that the NARIGP receive regular farmers’ reports to make timely decision about the crop. A study by Danso-Abbeam et al, (2018) show that the farmers timely farm reports help improve their productivity and also profitability. An interview with one of the NARIGP official indicated *“We supply the farmers with data collection tools that is ODK. However, the use of these tools has been challenging to some farmers. These tools are used to relay timely information.”*

Statement ME06, the farmers are capable to analyze and deduce from the data collected, 48(33.6%) strongly agreed and 56(39.2%) agreed whereas 16(11.2%) held neutral stand. The line item recorded mean of 3.82 higher than composite mean of 3.66. The results

imply that the farmers are capable to analyze and deduce from the data collected. A line item SD was 1.220 lower than the composite SDev of 1.321 indicating that the farmers had convergent opinions on that the farmers are capable to analyze and deduce from the data collected. Boyera et al, (2017) on farmer profiling indicated that the farmers' capability to analyse the farm data provides the biggest opportunity to farmers in terms of maximizing the output. A session with one of the farmers indicated *"Once the seedlings are planted, a close collaboration between the NARIGP officials and us the farmers is essential. This collaboration has really helped in ensuring that we work within the budget. Any challenges that we experience in the course of the project including the emergence of diseases are channeled out and are addressed almost immediately."*

Statement ME07, the NARIGP have easy platform for sharing and reporting field data, 37(25.9%) strongly agreed and 56(39.2%) agreed whereas 9(6.3%) held neutral stand. The statement had a mean of 3.49 lower than composite mean of 3.66. The results imply that the NARIGP do not have easy platform for sharing and reporting field data. A line item SD was 1.273 higher than composite SDev of 1.321 inferring that the farmers had divergent opinions on that the NARIGP have easy platform for sharing and reporting field data. A study by Kamilaris et al, (2017) on big data analytics in agriculture revealed that data platforms provide the benefit of storing and analyzing data from the farms and other factors related to this sector like weather, market demand and human population in one modern and well-designed system. An interview with one of the NARIGP official indicated *"We supply the farmers with data collection tools that is ODK. However, the use of these tools has been challenging to some farmers. These tools are used to relay timely information."*

Statement ME08, there are regular meetings conducted to deliberate on challenges experienced during growing of the crop, 49(34.3%) strongly agreed and 50(35.0%) agreed whereas 18(12.6%) held neutral stand. The statement recorded mean of 3.78 higher than composite mean of 3.66. The results imply that the regular meetings are conducted to deliberate on challenges experienced during growing of the crop. A line item SD was 1.241 lower than the composite SDev of 1.321 indicating that the farmers had convergent opinions on that he regular meetings are conducted to deliberate on

challenges experienced during growing of the crop. A report by Brown et al, (1992) explain that farmer meetings are meant to collect input on needs, challenges, and proposed solutions, train on new technologies or process innovation, collect feedback on technologies or process innovations and promote farmer to farmer learning. A session with one of the tissue culture farmers indicate “Whenever *there are challenges that cut across farmers for example the occurrence of disease spread, common meetings are organized to deliberate on the challenges. For individual challenges, we conduct the officials directly.*”

Statement ME09, farmers have access to all information to improve on cultivation of crop, 40(28.0%) strongly agreed and 55(38.5%) agreed whereas 12(8.4%) held neutral stand. The statement recorded mean of 3.56 lower than composite mean of 3.66. The results imply that farmers do not have access to all information so as to improve on cultivation of crop. A line item SD was 1.362 higher than composite SDev of 1.321 indicating that the farmers had divergent opinions on that farmers have access to all information so as to improve on cultivation of crop. Anunobi and Anunobi's (2017) study on enhancing accessibility of information by farmers in rural area through ICT-based extension information services found that information deployment for agricultural extension services was well received, with testimonials of success in areas of cost-effective delivery, simple and prompt access, and complete information to farmers. An interview with a NARIGP official indicated “*Involving farmers in planning stages of the project helps in incorporating their ideas in the project and also increases the uptake of the tissue culture banana among the farmers.*”

4.7.2 Correlation between Monitoring and Evaluation and Performance of Tissue Culture Banana Farming

Analysis to determine direction as well as magnitude of the association between the M & E (independent variable) and performance of tissue culture banana farming (dependent variable) was conducted.

The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 implied perfect positive correlation, while -1 implied perfect negative correlation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied moderately-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied very strong correlation.

Table 4.20 Correlation analysis between monitoring and evaluation and performance of tissue culture banana farming

		Performance of Tissue Culture	Monitoring Evaluation
Performance of Tissue Culture	Pearson Correlation	1	0.783**
	Sig. (2-tailed)		0.000
	n	143	143
Monitoring Evaluation	Pearson Correlation	0.783**	1
	Sig. (2-tailed)	0.000	
	n	143	143

** Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 4.20, there is a very strong positive correlation between performance of tissue culture banana project and monitoring and evaluation ($r=0.783$) and the association is significant ($p=0.000<0.05$). A study conducted by Wachaiyu (2016) reveals that the strength of the M and E plan played a key role in the determination of the project success.

4.7.3 Regression Analysis of Monitoring and Evaluation and performance of tissue culture banana farming

Simple linear regression was done to assess the association between the predictor and the outcome variable.

Hypothesis Testing

Simple regression model was utilized in testing the hypothesis

H₀, M and E has no significant relationship with performance of tissue culture banana in Hamisi Sub-County.

H₁, M and E has a significant relationship with performance of tissue culture banana in Hamisi Sub-County.

Regression Model

Model summary that tested null hypothesis is as presented as follows:

$$Y = B_0 + B_1X_1 + \varepsilon$$

Where

Y = Performance of Tissue culture banana project

X₁ = Monitoring and Evaluation

B₀ = Constant term

B₁ = Beta coefficient

ε = Error term

Table 4.21: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.783a	0.613	0.610	0.49983

Table 4.21 unveil a coefficient of determination of 0.613. This means that Monitoring and Evaluation contributes 61.3% towards the performance of tissue culture banana farming. M & E therefore is a crucial aspect in performance of tissue culture banana farming. The ANOVA is presented in Table 4.22

Table 4.22: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	55.796	1	55.796	223.334	0.000b
Residual	35.226	141	0.25		
Total	91.022	142			

a Dependent Variable: Performance of Tissue Culture

b Predictors: (Constant), Monitoring and Evaluation Mean

The results shown above in Table 4.22 reveal that the model is statistically significant. Two tail approach tested the significance of the model. The reported P-Value of 0.000 is lesser than conventional P-Value of 0.05 and also the calculated F-value of 223.334 is greater than the F critical value of 3.90 ($F_{1, 141}$) from the F table. Both indicators confirm the significance of the model. This means that M and E is a critical tool in determining the performance of tissue culture banana farming. The regression coefficient results are presented in Table 4.23.

Table 4.23: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.837	0.192		4.363	0.000
Monitoring and Evaluation	0.756	0.051	0.783	14.944	0.000

Regression Model

$$Y=0.837+0.756X$$

Where,

Y=Performance of tissue culture banana

X=Monitoring and evaluation

The coefficient of the model is positive implying that Monitoring and Evaluation is not the only factor that affect the performance of tissue culture banana farming. Hence, even in the absence of Monitoring and Evaluation as a tool, other factors may come to play and finally get positive yields.

From the results, Monitoring and Evaluation and performance of tissue culture banana have a positive and substantial link ($\beta=0.756$, $p=0.000$). A unit improvement in M and E leads to an increase by .756 units of performance of tissue culture banana. The null hypothesis was that M and E has no substantial association with performance of tissue culture banana in Hamisi Sub-County. The results unveiled that obtained P-value of 0.000 is less than the conventional p-value of 0.05. Thus, the null hypothesis is rejected and the conclusion made that M and E has a significant impact in the performance of tissue culture banana farming.

M & E is a critical tool in the performance of tissue culture banana farming. Monitoring and evaluation pertains issues including financial monitoring, regular data collection and data dissemination. For financial monitoring, farmers should be well trained on budget preparation, on ways of utilizing funds and provided with financial support where necessary to enable them undertake production. Regular data collection includes training farmers on the data collection tools that enables the report various challenges including disease outbreaks. Data dissemination platforms should also be provided to ease communication. This research is in tandem with past studies by other scholars.

The results also concur with the findings by Mushori, *et al.* (2020) that effective M and E is pre-requisite for successful performance of county government funded infrastructural development projects. A study conducted by Wachaiyu (2016) reveals that the strength of the M and E plan played a key role in the determination of the project success. Kissi, *et al.* (2019) postulated that M and E practices had a positive and statistically substantial association with construction projects success criteria. An interview with a NARIGP official indicated “*The training we give to farmers in terms of budget preparation and prudent use of the funds have played key role in ensuring the success of the project. We*

have also trained farmers on the ways of collecting and disseminating data. As soon as we receive any emerging issue, we act on them immediately to avoid spread in cases of diseases.”

4.8 Combined influence of project management practices and performance of tissue culture banana

The section discusses descriptive and inferential which covers both correlational and regression analyses for the fifth objective.

4.8.1 Descriptive Statistics of Combined Influence of Project Management Practices and Performance of Tissue Culture Banana Projects

The combination of project planning, capacity building, project implementation and M and E were termed as combined management practices. The influence of these combined factors was tested using both descriptive and inferential statistics (Table 4.24).

Table 4.24: Combined Influence of Project Management Practices and Performance of Tissue Culture Banana Projects

Variable Dimension / indicator	Mean (M)	Std Dev
Project planning	3.65	1.269
Capacity building	3.70	1.291
Project implementation	3.68	1.309
Monitoring and evaluation	3.66	1.321
Composite mean and SDev	3.67	1.298

The results of the overall mean of project management practices was 3.67 as shown in Table 4.24. The dominant variable was capacity building (M=3.70). This result means that the predictor variable explains performance well and that it also implies that investing in capacity building in the project is paramount for realization of performance

tissue culture projects. The SDev was 1.291 lower than composite SD of 1.298, inferring convergent views among the participants. Project planning (M=3.65) implies project planning requires improvement and had little influence on performance of tissue culture projects. Project planning had a SDev of 1.269 lower than the composite SDev of 1.298 meaning the opinions were convergent. In a comment by a NARIGP official, the commend indicated, *“Mentorship that is we give to the Tissue culture banana farmers is key in ensuring the success of Tissue culture banana project in this region. We have been able to train farmers and provide technical assistance when they are carrying out the tissue culture banana farming. We this, we tremendously improved the rate of project success.”*

There is need to improve on the aspects of project implementation (M=3.68). The mean of project implementation is greater than composite mean of 3.67 inferring that project implementation has greater influence on the performance of tissue culture banana projects. The SDev was 1.309 which is greater than the composite SDev of 1.298 meaning that the opinions of the respondents were divergent. For monitoring and evaluation, the mean is (M=3.66) which is less than composite mean of 3.67 an indication that M and E in management of banana tissue projects require improvement. The standard deviations were 1.321 which is greater than composite SDev of 1.298 meaning that the opinions of the respondents were inconsistent.

4.8.2 Correlation between Combined Management Practices and Performance of Tissue Culture Banana Projects.

Correlational analysis of combined management practices and Performance of tissue culture banana projects was done to examine strength as well as direction of relationship.

The values obtained from the correlational analysis ranged between +1 and -1. In this regard, +1 implied perfect positive correlation, while -1 implied perfect negative correlation. 0.000 implied no correlation; the modular values 0.001 to 0.250 implied weak correlation; 0.251 to 0.500 implied moderately-strong correlation; 0.501 to 0.750 implied strong correlation; and 0.751 to 1.000 implied very strong correlation.

Table 4.25: Correlation between Combined Management Practices and Performance of Tissue Culture Banana Projects.

Correlations

Variables		Combined project management practices	Project Planning	Capacity Building	Project implementation	Monitoring and Evaluation
Performance of Tissue culture banana projects	Pearson Correlation	0.879**	0.764**	.776**	0.812**	0.783**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000
	n	143	143	143	143	143

****Correlation is significant at 0.05 level of significant (2-tailed)**

The correlation analysis results shown in Table 4.25 unveil positive and substantial coefficients between the predictors and criterion variables. Project planning had a very strong and positive correlation with performance tissue culture banana projects ($r=0.764$, $p=0.000<0.05$). Capacity building and performance tissue culture banana projects very strongly and positively correlated ($r=0.776$, $p=0.000<0.05$). Project implementation revealed a very strong and positive correlation ($r=0.812$, $p=0.000<0.05$) and finally M and E had a very strong and positive correlation with performance of tissue culture banana projects ($r=0.783$, $p=0.000<0.05$). However, when all predictors are all combined as project management practices, the model reveals a very strong and positive correlation with performance of tissue culture banana projects ($r=0.879$, $p=0.000<0.05$). The finding is in line with Ndachi and Kimutai (2018) research which showed a connection between project planning and project performance.

4.8.3 Regression Analysis of Combined Project Management Practices and Performance of Tissue Culture Banana Projects.

Moreover, multiple regression was undertaken in accordance with the fifth objective with the aim of determining how combined project management practices influences performance of County funded road construction projects. The null hypothesis was tested by multiple linear regression.

Hypothesis Testing

Multiple regression was utilized in testing the hypothesis:

H₀: Combined project management practices has no significant relationship with performance of Tissue culture banana projects in Hamisi sub county, Vihiga County.

H₁: Combined project management practices has significant relationship with performance of Tissue culture banana projects in Hamisi sub county, Vihiga County.

Regression Model

The mathematical model that tested null hypothesis is as follows:

Performance of Tissue culture banana projects = f (project planning, capacity building, project implementation and M & E.)

$$Y = f(X_1, X_2, X_3, X_4, \varepsilon)$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y = Performance of tissue culture banana projects in Hamisi Sub county Vihiga County

X₁ = Project Planning.

X₂ = Capacity building.

X₃ = Project implementation

X₄ = Monitoring and Evaluation.

β₀ = Constant term

β₁, β₂, β₃ and β₄ = Beta coefficients

ε = Error term

Analysis was done and regression results for the relationship between combined project management practices on performance of tissue culture banana projects was presented in Table 4.26.

Table 4.26: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.880a	0.774	0.768	0.38569

a. Predictors: (Constant), monitoring and evaluation, capacity building, project planning, project implementation

From the results in Table 4.26, project planning, capacity building, project implementation and M and E are jointly substantial in determining the performance of tissue culture banana farming. This is indicated by the adjusted coefficient of determination of 0.768. This imply that the joint management practices jointly contribute 76.8% of the total variations in the performance of tissue culture banana farming.

Table 4.27: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	70.494	4	17.624	118.474	0.000b
Residual	20.528	138	0.149		
Total	91.022	142			

a Dependent Variable: Performance of tissue culture

b Predictors: (Constant), M and E, capacity building, project planning, project implementation

In Table 4.27, the model is statistically significant. Two tail test approach was used to test the implication of the model. The reported p-value of 0.000 is less than the conventional p-value of 0.05. Also, the calculated F value of 118.474 is greater than F critical value of 2.45 ($F_{4, 138}$) from the F table. The two conditions confirm the statistical significance of the model. This means that project planning, capacity building, project implementation and M and E are all significant in the performance of tissue culture farming in Hamisi Vihiga County. Table 4.28 shows regression of coefficient results.

Table 4.28: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.103	0.176		-0.583	0.561
Project planning	0.216	0.071	0.202	3.038	0.003
Capacity building	0.264	0.069	0.251	3.819	0.000
Project implementation	0.312	0.078	0.296	4.018	0.000
Monitoring evaluation	0.228	0.067	0.236	3.408	0.001

Regression model.

$$Y = -.103 + .202X_1 + .251X_2 + .296X_3 + .236X_4$$

Where,

Y=Performance of tissue culture banana

X₁=Project planning

X₂=Capacity building

X₃=Project implementation

X₄=Monitoring and evaluation

The constant for the model is negative (-.103). This means that in the absence of project planning, capacity building, project implementation and M and E, the performance of tissue culture banana farming will be negative. Therefore, all these management practices are necessary for optimal performance of banana tissue culture.

The regression analysis show that project planning and performance of tissue culture banana farming have a positive and significant link ($\beta=0.202$, $p=0.003$). This means that a unit improvement in project planning leads to an increase in 0.202 units of tissue culture banana performance. The null hypothesis was that project planning has no substantial link with performance of tissue culture banana in Hamisi Sub-County. From the results, p value of $0.003 < 0.05$. Therefore, the null hypothesis was rejected and the

conclusion made that Project planning has significant impact in the performance of tissue culture banana farming in Hamisi Vihiga County.

Capacity building and performance of tissue culture banana farming enjoy a positive and substantial link ($\beta=0.251$, $p=0.000$). Therefore, a unit increase in capacity building will lead to an increase by 0.251 units in the performance of tissue culture banana. The null hypothesis was that capacity building has no substantial link with performance of tissue culture banana in Hamisi Sub-County. From the results, the p-value obtained of 0.000 is lesser than conventional p-value of 0.05. Therefore, the null hypothesis was rejected and the conclusion made that capacity building is a crucial aspect in in performance of tissue culture banana farming.

From the results in Table 4.28, project implementation and performance of tissue culture banana farming ($\beta=0.296$, $p=0.000$). a unit improvement in project implementation may result to an increase by 0.296 units in the performance of tissue culture banana. The null hypothesis was that project implementation has no significant association with performance of tissue culture banana in Hamisi Sub-County. Findings unveil that the obtained p-value of 0.000 is lesser than conventional p-value of .05. Therefore, the null hypothesis was rejected and conclusion made that project implementation has a significant impact in the performance of tissue culture banana farming.

From the results, Monitoring and Evaluation and performance of tissue culture banana have a positive and substantial link ($\beta=0.236$, $p=0.000$). A unit improvement in M and E will result in an increase by 0.236 units of performance of tissue culture banana. The null hypothesis was that M and E has no substantial association with performance of tissue culture banana in Hamisi Sub-County. Findings indicated that obtained p-value of 0.001 is less than the conventional p-value of 0.05. Thus, the null hypothesis is rejected and the conclusion made that M and E had significant impact in the performance of tissue culture banana farming.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

The chapter outlines findings, conclusions as well as recommendations to determine the effects of management practices and performance of tissue culture banana project. It also proposes suggestions on areas of future research. The first section provides a summary of the general findings. The results are drawn from interviews and also from questionnaires. The next section provides conclusions of the findings then recommendations drawn from conclusions. Recommendations for further research is covered last.

5.2 Summary of findings.

The summaries of findings are presented in the subsequent section.

5.2.1 Project Planning

The first objective purposed to evaluate the influence of project planning on performance of tissue culture banana in Hamisi Sub-County. Descriptive results show that project planning is a vital aspect in performance of Tissue Culture Banana projects with a mean of 3.65 and a SDev of 1.27. The null hypothesis in this regard was that project planning has no substantial association with performance of tissue culture banana in Hamisi Sub-County. A test of null hypothesis was done which indicated that $R=0.764$, $R^2=0.583$, $\beta=0.816$, $t=14.053$, $F_{(1,141)}=197.5$ and $P=0.000<0.05$. The null hypothesis was rejected and concluded that project planning recorded a substantial relationship with performance of tissue culture banana in Hamisi Sub-County. The conclusion was that project planning explained up to 58.3% of the performance of tissue culture banana projects.

5.2.2 Capacity Building

The second objective purposed to assess the influence of Capacity Building on performance of tissue culture banana in Hamisi Sub-County. The descriptive results indicated that capacity building play a significant role in the performance of tissue culture banana farming with a mean of 3.70 and a standard deviation of 1.29. The null hypothesis in this regard was that capacity building has no substantial link with performance of

tissue culture banana in Hamisi Sub-County. A test of null hypothesis was done which indicated that $R=0.776$, $R^2=0.602$, $\beta=0.815$, $t=14.589$, $F_{(1,141)}=212.831$ and $P=0.000<0.05$. The null hypothesis was rejected and it was concluded that capacity building has a significant relationship with performance of tissue culture banana in Hamisi Sub-County. The conclusion was that capacity building explained up to 60.2% of the performance of tissue culture banana projects.

5.2.3 Project Implementation.

The third objective purposed to assess the influence of project implementation on performance of tissue culture banana in Hamisi Sub-County. Descriptive results indicated that respondents participated in the entire project implementation process with a mean of 3.68 and SDev of 1.31. The null hypothesis in this regard was that project implementation no has significant association with performance of tissue culture banana in Hamisi Sub-County. The null hypothesis was tested and the from the tests indicated that $R=0.812$, $R^2=0.659$, $\beta=0.856$, $t=16.526$, $F_{(1,141)}=273.093$ and $P=0.000<0.05$. The null hypothesis was rejected and it was concluded that project implementation has a significant relationship with performance of tissue culture banana in Hamisi Sub-County. The conclusion was that project implementation explained up to 65.9% of the performance of tissue culture banana projects.

5.2.4 Monitoring and evaluation

The fourth objective purposed to assess the influence of $M \wedge E$ on performance of tissue culture banana in Hamisi Sub-County. Descriptive statistics indicate that the respondents were involved in the M and E process with a mean of 3.66 and a standard deviation of 1.32. The null hypothesis in this regard was that M and E has no substantial association with performance of tissue culture banana in Hamisi Sub-County. A test of null hypothesis was done which indicated that $R=0.783$, $R^2=0.613$, $\beta=0.756$, $t=14.944$, $F_{(1,141)}=223.334$ and $P=0.000<0.05$. The null hypothesis was rejected and it was concluded that M and E has a substantial relationship with performance of tissue culture banana in Hamisi Sub-County. The conclusion was that monitoring and evaluation explained up to 65.9% of the performance of tissue culture banana projects.

5.2.5 Combined Influence of Project management practices

The fifth objective purposed to evaluate the combined influence of project management practices on performance of tissue culture banana in Hamisi Sub-County. The results of the overall mean of project management practices was 3.67 and SDev of 1.298. In terms of correlation analysis, all combined as project management practices, the model reveals a very strong and positive correlation with performance of tissue culture banana projects ($r=0.879$, $p=0.000<0.05$). The null hypothesis in this regard was that the combined project management practices have no significant relationship with performance of tissue culture banana culture in Hamisi Sub-County. A test of null hypothesis was done which indicated that $R=0.880$, $R^2=0.774$, $F_{(4,138)}=118.474$ and $P=0.000<0.05$. The null hypothesis was rejected and concluded that project management practices have substantial link with performance of tissue culture banana in Hamisi Sub-County.

5.3 Conclusion

These conclusions have been made regarding the independent variables. Project planning is a vital element in improving the performance of Tissue culture banana project. A good project plan boosts chances of project success by identifying the problem, setting the objectives to achieve the target results, developing alternatives and finally making choices from the alternatives. A good project plan should be all inclusive and should involve all the stakeholders.

Capacity building from the analysis is a key factor that contributes positively and significantly in determining the performance of Tissue culture banana project. Capacity building improves the performance of banana tissue culture through provision of training on budgets which help farmers prepare adequately for the project, helping farmers during seed selection to ensure the farmers get quality seedlings, training the farmers on the goals of a project, training farmers on the types of diseases, symptoms and control, helping to market the produce and providing education tours and exhibition services. Capacity building should be all-inclusive and fair.

Project implementation as presented by the results of this study is the most important factor in determining the performance of tissue culture banana farming. Thus, even in the

absence of the other factors, project implementation stage is a stage that cannot be avoided. Project implementation boosts chances of success of tissue culture banana project by equipping farmers with quality seedlings, supplying farmers with fertilizers, doing soil testing, training farmers on appropriate spacing, advising on planting and harvesting seasons and also the harvesting techniques. This stage should involve all the stakeholders.

M and E remain a critical tool that determines the performance of tissue culture banana project. Monitoring and evaluation is effected through, stakeholder budget planning participation, training farmers on the utilization of funds, providing financial support to farmers when in need, enabling farmers do and disseminate regular data by providing the necessary tools and conducting regular meetings. This is always important as it ensures sustainability and the success of the project.

Finally, project management practices have substantial relationship with performance of tissue culture banana. The study concludes that project management practices play significant role in promoting the performance tissue culture banana projects. Adoption of project management methods is becoming a fundamental strategy for increasing project performance through successful project execution.

5.4 Recommendations of the Study.

Below recommendations have been made as per the findings;

- i. Agricultural extension officers to help culture banana farmers how to create viable plan that will guide them in planting and managing for the tissue culture banana by outlining the necessary farm input and procedures of tissue culture farming.
- ii. Recruit and train more extension officers to enable availability of extension services to all farmers.
- iii. Collaborate with the county government ministry of agriculture so that they provide financial support or provide seedlings to farmers.
- iv. Come up with a customer care desk where farmers can visit or make a call for instant assistance.

- v. Provide funding to the women who are willing to engage in tissue culture banana to improve in their participation.
- vi. Encourage doing the tissue culture banana projects in groups so as to make it accessible to those who do not have access to land.
- vii. Advise on the minimum acreage for carrying out tissue culture banana farming so that the farmers can get optimal yields from the project.

5.5 Contribution to body of Knowledge and Suggestion for further research

5.5.1 Contribution to the body of knowledge

The study outcome may contribute to theories and body of knowledge. The research unveiled that project planning, capacity building, project implementation and M and E are jointly significant in determining the performance of tissue culture banana farming. The results support the postulation of the Project Management Competency Theory that competency is a relative skill that can be improved via training and capacity development. According to Project Management Competency, competence is crucial in enhancing performance of projects. The theory outlines the contextual as well as technical abilities and competencies that managers of a project ought to possess in order to complete projects within stipulated budgets, on schedule, with quality desired, and in line with scope. Likewise, Edum-Fotwe (2011) acknowledged that project manager's level of expertise will influence project performance. Similarly, Lewis (2010) studying competency and skills established that project management competences influenced major Swedish enterprises' project management.

Project management is a resource intensive activity. The study findings collaborated the arguments of the Resource Based View Theory that advocates for a variable framework for organizing a firm's resource allocation so as to gain a long-term competitive advantage. According to the fathers of RBV theory, Rumelt (1984) and Wernerfelt (1984), financial, technological, as well as physical resources are combined in the managerial environment to determine payment solution success. The success rate of projects is linked to performance, making payment performance crucial. The idea is relevant to the study since it describes a decisive factor in the success of financial technology enterprises. The

theory will anchor the variables project planning capacity building project execution and monitoring and evaluation as resources that help in project performance.

5.5.2 Suggestion for Further Research

Tissue culture farming is being supported by Rural Inclusive Growth Project(RIG) for Kenya backed by World Bank in collaboration with Kenyan government and counties. The project purposed to improve rural populations' livelihood and minimize their vulnerability by raising agricultural productivity and profitability in some selected Kenyan counties. Similar research undertaken in other Kenyan counties to determine how Rural Inclusive Growth Project management practices have impacted agricultural productivity in rural settings with particular focus to banana farming.

Future studied may also opine to investigate factors that influence low women participation in the tissue culture banana farming. This will help uncover the role of demographic information on the growth of tissue culture banana farming in Kenya. Further, future studies may focus at determining the effect of Tissue culture banana farming on the economy of the banana farming households.

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APPENDICES

Appendix I: Introduction Letter

CAROLYNE MAVITIRU,
PO BOX 8775 00200
NAIROBI.

16/8/2020

COUNTY GOVERNMENT OF VIHIGA,
PO BOX 344 50300
MBALE TOWN.

Dear Sir,

RE: Project Management Practices and Performances of Tissue Banana of National Agricultural Rural Inclusive Growth Project (Narigp) in Hamisi Sub County, Vihiga County, Kenya.

I'm a postgraduate student at the University of Nairobi undertaking a master of arts Degree in project planning and management. I intend to conduct a study on the above topic which is a requirement that must be met in order to successfully complete the course. I am therefore requesting for data regarding the number of registered farmers and their respective CBO's enlisted in the Tissue Banana in Hamisi Sub-County. The data you share shall be handled with utmost privacy and confidentiality

Yours faithfully,

Carolyne Mavitiru

Appendix II: Letter from NARIGP.



County Government of Vihiga

NATIONAL AGRICULTURAL & RURAL INCLUSIVE GROWTH PROJECT

COUNTY PROJECT COORDINATION UNIT

28/6/2021 When replying please quote:

Ref: NARIGP/VIHIGA/CORR.RPTs/VOL 1/7

To whom it may concern

RE: Requested Data

Chicken VC 4,420 beneficiaries in 147 groups

Dairy VC 2,940 in 105 groups

Banana VC 1,682 in 58 groups

Local Vegetable VC in 2,059 in 71 groups

Total number of staff in the project is 12

Banana value chain in Hamisi

11 Groups with a total of 284 members in 5 wards.

Most farmers went to chicken and dairy Value chain.

Best Regards.

ALUDA C.L.

CPC

NARIGP

VIHIGA COUNTY

Appendix III: NARIGP funded groups along the banana value chain

S/NO	Ward	Value Chain	Investment Window	Grant Category	Group Name	Membership					Project Title	contact			
						male	female	youth male	youth female	Total		chairperson			
1	Banja	Banana	SLM IN VC	VC	kipsigor banana group	7	19		6	26	tissue culture banana production	PRISCAH AFANDI	726984655	MARY OSIDE	700159672
2	Banja	Banana	SLMin VC	VC	Museywa maendeleo SHG	8	23		5	31	Tissue culture hardening nursery for increased banana production	EMMY SAGINA	723835554	JANE AGOSTA	721432946
3	Banja	Banana	SLM IN VC	VC	Bweywe women group	3	26		5	29	Tissue culture banana production	MARGARET D	728541703	MABLE KASHEMWA	712374860
4	Banja	Banana	SLM IN VC	VC	REHEMA YOUTH GROUP	15	10	3	0	25	TISSUE CULTURE BANANA	EMMY KARANI	705619048	SALIM MZEE	722124292

											GROWING				
5	Banja	Banana	SLM IN VC	VC	CYPRUS YOUTH GROUP	23	6	18	4	29	INCREASE BANANA PRODUCTION	DAVID AMIMO	725733945	EDWIN KHADEJI	718148899
6	Gisambai	Banana	SLM in VC	VC	Lwosaga Farmers group	8	18			26	upgrading banana through Tissue culture bananas				
7	Gisambai	BANANA	SLM/VC	VC	VIHIGA VICARAGE MOTHERS UNION	5	20	2	2		BANANA FLOUR MILLING	ESNASI ISALIKU	720067816	VIOLET SHIVACHI	702111304
8	Gisambai	Banana	SLM/VC	VC	GAVUD UNYI NDIZIFARMERS SHG	9	16	0	0	25	EXPANSION OF BANANA PLANTING TO HELP GENERATE INCOME AS AN ECONOMIC ACTIVITY	CONSOLATA MWENESI	727298447	EDITH MMBONDE	718265978

9	Gisambai	Banana	SLM/VC	VC	Gamoi widows	2	25			27	TCB banana production	ESTHER CHEBUI	725050470	EVERLYNE LUVAI	710819845
10	Shiru	BANANA	SLM IN VC	VC	Mwambuli women group	9	16		3	25	Tissue culture banana production for increased income	WILFRIDAH KHASIANI	729548486	JACKSON AMBE	721765087
11	Shiru	banana	SLM IN VC	VC	Cheptuluf acal area development group	10	17		2	27	tissue culture banana production for increased yeields	REBECCA AYESA	729293151	JERREMY AGALOMBA	759352632
12	Shiru	BANANA	SLM IN VC	VC	Makuchijointy welfare	11	22		5	33	tissue culture banana production				
13	Shiru	BANANA	SLM/VC	VC	ISANGA COMBINED SELF HELP GROUP	11	19	2	1	30	ISANGA BANANA PRODUCTION PROJECT	ELPHAS LIDONDO	725065406	JOSEPH BULEMI	726875577

14	Tambua	Banana	SLM IN VC	VC	Composite porridge flour value addition farmers SHP	10	15		8	25	Banana flour milling value addition	LUKA KEYA	727058391	RAYMOND AJEGA	725075139
15	Tambua	Banana	SLM IN VC	VC	Jitahidi farmers women group	7	23			30	Banana flour milling value addition	BEATRICE KIRUNDU	723529546	CHRISTINE OSAGA	71401813
16	Shamakhoko	Banana	SLM IN VC	VC	Kalwani commercial banana farmers group	11	14			25	Kalwani banana seedlings production	JOSEPH AMUHONDA	715159482	JAMES RAY ESOSO	713524522
17	Shamakhoko	BANANA	SLM/VC	VC	NishikemkonoHamsi women in development group	8	17	4		25	Nishikemkono tissue culture banana project	ASBETA BULIMO	708459018	NANCY KIMIYA	713443441

157 306 29 41 438

Appendix IV: Questionnaire for Tissue Culture Banana Farmers

I am a student at the University of Nairobi undertaking a Master's degree in Project Planning and Management requesting for your participation in this study by responding to the statements in the sections provided. All responses will be treated with confidentiality.

SECTION A

1. Please fill the details required Personal Information (Put a tick where appropriate)

Gender

Male

Female

2. Age Bracket

Below 30 years

31-40 years

41-50 years

51 and above year

3. Highest academic qualification attained

Primary

Secondary

Certificate

Diploma

Degree

(Other)

4. What is the size of your farm land?.....
5. Are you the owner of the land (Yes/No)If No, please specify the nature of ownership (family, rental, e.t.c)

SECTION B: Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about performance of tissue culture banana. Please tick (✓) the space corresponding to the correct answer in each question below. **Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5**

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Jobs Creation						
PP1	Farming of Tissue Culture Banana has led to job creation among the families.					
PP2	During COVID 19 the crop was the main source of livelihood.					
PP3	The crop has brought employment among the youth					
Quality of Farm Produce						
PP4	Farmers have realized that Tissue Culture Banana produce have a higher quality than the traditional ones					
PP5	Farmers' produce are marketable in the other Counties					
PP6	Quality of the crop has led to higher yields.					
Household Income						
PP7	Farmers are able to meet household's basic needs.					
PP8	Farmers are able to save					
PP9	Farmers are able to educate their children.					

What is your personal experience with performance of banana tissue culture projects in Hamisi Sub-County?

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SECTION C: Project Planning and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of project planning on performance of tissue culture banana. Please tick (√) the space corresponding to the correct answer in each question below. **Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5**

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Stakeholder Engagement						
PR01	Farmers participated in project budget planning					
PR02	The decision concerning seed selection was agreed upon by all the farmers.					
P03	Farmers were part and parcel of project goals and objectives.					
Project extension activities						
PR04	Project extension activities were regularly conducted					
PR05	Farming activities were supported by extension services					
P06	NARGIP team established demonstration sites among the CBOs' involved.					
Feasibility study						
PR07	The feasibility study revealed project viability among the households selected					
PR08	The household needs of individual farmers were prioritized in the feasibility study as part of project planning					

PR09	Social and environmental assessment was compressively conducted					
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In your own opinion how else has project planning influenced performance of banana tissue culture projects?

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SECTION D: Capacity Building and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of capacity building on performance of tissue culture banana. Please tick (√) the space corresponding to the correct answer in each question below. **Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5**

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Farmer Training						
CB01	Farmers participated in project budget planning					
CB02	The decision concerning seed selection was agreed upon by all the farmers.					
CB03	Farmers were part and parcel of project goals and objectives.					
Technical Assistance to Farmers' CBO's						
CB04	Project extension activities were regularly conducted					
CB05	Farming activities were supported by extension services					

P06	Through extension services, farmers are able to make informed decision the new technology of farming.					
Mentorship						
CB07	Farmers receive regularly support on marketing produce.					
CB08	Farmers are taken to educational tours					
CB09	The NARGIP project team holds regular farmer-exhibitions.					

In your own opinion how has capacity building influenced performance of banana tissue culture projects?

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SECTION E: Project Implementation and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of project implementation on performance of tissue culture banana.

Please tick (√) the space corresponding to the correct answer in each question below.

Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree =

5

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Assembling of Planting Materials						
PI01	Farmers were adequately equipped with seedbeds					
PI02	Farmers were initially supplied with sufficient					

	seedlings.					
PI03	Farmers were supplied with all required fertilizers.					
Crop Management						
PI04	The soil was tested for the right amount of contents					
PI05	Correct planting spacing was observed during the planting of the banana transplants.					
PI06	Crop protection against diseases was done at the right time					
Work Breakdown Structure						
PI07	Planting season is supervised by the NARIGP field support team.					
PI08	Farmers are aware of the harvesting season.					
PI09	Farmers are guided on harvesting techniques					

In your own opinion how does project implementation influence performance of banana tissue culture projects?

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SECTION F: Monitoring and Evaluation and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of monitoring and evaluation on performance of tissue culture banana. Please tick (✓) the space corresponding to the correct answer in each question below. Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Financial Monitoring						
ME01	Farmers participated in project budget planning					
ME02	CBOs' are accountable on the utilization of funds.					
ME03	Disbursement of financial support is fairly shared among the farmers.					
Regular Data Collection						
ME04	Farmers have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect).					
ME05	NARIGP receive regular farmers' reports to make timely decision about the crop.					
ME06	Farmers are capable to analyze and deduce from the data collected.					
Data Dissemination						
ME07	NARIGP have easy platform for sharing and reporting field data.					

ME08	Regular meetings are conducted to deliberate on challenges experienced during growing of the crop.					
ME09	Farmers have access to all information so as to improve on cultivation of crop.					

In your own opinion how has monitoring and evaluation influenced performance of banana tissue culture projects?

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Thank you

Appendix V: Questionnaire for NARIGP Officials

I am a student at the University of Nairobi undertaking a Master's degree in Project Planning and Management requesting for your participation in this study by responding to the statements in the sections provided. All responses will be treated with confidentiality.

SECTION A

1. Please fill the details required Personal Information (Put a tick where appropriate)

Gender []
Female []
Male []

2. Age Bracket

Below 30 years []

31-40 years []

41-50 years []

51 and above year []

3. Highest academic qualification attained

Primary [] []
Secondary [] []
Certificate [] []
Diploma [] []
Degree [] []
(Other) [] []

4. How many years of experience do you possess in agricultural extension service?.....

SECTION B: Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about performance of tissue culture banana. Please tick (✓) the space corresponding to the correct answer in each question below. **Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5**

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Jobs Creation						
PP1	Farming of Tissue Culture Banana has led to job creation among the families.					
PP2	During COVID 19 the crop was the main source of livelihood.					
PP3	The crop has brought employment among the youth					
Quality of Farm Produce						
PP4	Farmers have realized that Tissue Culture Banana produce have a higher quality than the traditional ones					
PP5	Farmers’ produce are marketable in the other Counties					
PP6	Quality of the crop has led to higher yields.					
Household Income						
PP7	Farmers are able to meet household’s basic needs.					
PP8	Farmers are able to save					
PP9	Farmers are able to educate their children.					

What is your personal experience with performance of banana tissue culture projects in Hamisi Sub-County?

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SECTION C: Project Planning and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of project planning on performance of tissue culture banana. Please tick (√) the space corresponding to the correct answer in each question below. **Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5**

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Stakeholder Engagement						
PR01	Farmers participated in project budget planning					
PR02	The decision concerning seed selection was agreed upon by all the farmers.					
P03	Farmers were part and parcel of project goals and objectives.					
Project extension activities						
PR04	Project extension activities were regularly conducted					
PR05	Farming activities were supported by extension services					
P06	NARGIP team established demonstration sites among the CBOs' involved.					
Feasibility study						
PR07	The feasibility study revealed project viability among the households selected					
PR08	The household needs of individual farmers were prioritized in the feasibility study as part of project planning					

PR09	Social and environmental assessment was compressively conducted					
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In your own opinion how else has project planning influenced performance of banana tissue culture projects?

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SECTION D: Capacity Building and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of capacity building on performance of tissue culture banana. Please tick (✓) the space corresponding to the correct answer in each question below. **Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5**

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Farmer Training						
CB01	Farmers participated in project budget planning					
CB02	The decision concerning seed selection was agreed upon by all the farmers.					
CB03	Farmers were part and parcel of project goals and objectives.					
Technical Assistance to Farmers' CBO's						
CB04	Project extension activities were regularly conducted					
CB05	Farming activities were supported by extension services					

P06	Through extension services, farmers are able to make informed decision the new technology of farming.					
Mentorship						
CB07	Farmers receive regularly support on marketing produce.					
CB08	Farmers are taken to educational tours					
CB09	The NARGIP project team holds regular farmer-exhibitions.					

In your own opinion how has capacity building influenced performance of banana tissue culture projects?

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SECTION E: Project Implementation and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of project implementation on performance of tissue culture banana. Please tick (✓) the space corresponding to the correct answer in each question below. Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Assembling of Planting Materials						
PI01	Farmers were adequately equipped with seedbeds					
PI02	Farmers were initially supplied with sufficient seedlings.					
PI03	Farmers were supplied with all required					

	fertilizers.					
Crop Management						
PI04	The soil was tested for the right amount of contents					
PI05	Correct planting spacing was observed during the planting of the banana transplants.					
PI06	Crop protection against diseases was done at the right time					
Work Breakdown Structure						
PI07	Planting season is supervised by the NARIGP field support team.					
PI08	Farmers are aware of the harvesting season.					
PI09	Farmers are guided on harvesting techniques					

In your own opinion how does project implementation influence performance of banana tissue culture projects?

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SECTION F: Monitoring and Evaluation and Performance of Tissue Culture Banana

Please indicate your level of agreement or disagreement with the following statements about influence of monitoring and evaluation on performance of tissue culture banana. Please tick (✓) the space corresponding to the correct answer in each question below. Scale: Strongly Disagree = 1: Disagree= 2: Neutral = 3: Agree = 4: Strongly Agree = 5

Code	Statement	Strongly Disagree	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Financial Monitoring						
ME01	Farmers participated in project budget planning					
ME02	CBOs' are accountable on the utilization of funds.					
ME03	Disbursement of financial support is fairly shared among the farmers.					
Regular Data Collection						
ME04	Farmers have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect).					
ME05	NARIGP receive regular farmers' reports to make timely decision about the crop.					
ME06	Farmers are capable to analyze and deduce from the data collected.					
Data Dissemination						
ME07	NARIGP have easy platform for sharing and reporting field data.					

ME08	Regular meetings are conducted to deliberate on challenges experienced during growing of the crop.					
ME09	Farmers have access to all information so as to improve on cultivation of crop.					

In your own opinion how has monitoring and evaluation influenced performance of banana tissue culture projects?

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Thank you

Appendix VI: Further Reliability Test results

Performance of Tissue Culture Banana

Reliability Statistics

Cronbach's Alpha	N of Items
.950	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Farming of Tissue Culture Banana has led to job creation among the families.	24.56	39.196	.445	.660
During COVID 19 the crop was the main source of livelihood.	25.00	39.200	.433	.663
The crop has brought employment among the youth	24.94	48.196	.008	.732
Farmers have realized that Tissue Culture Banana produce have a higher quality than the traditional ones	24.94	43.796	.214	.704
Farmers' produce are marketable in the other Counties	24.50	36.400	.613	.623
Quality of the crop has led to higher yields.	24.69	41.696	.411	.669
Farmers are able to meet household's basic needs.	24.56	35.729	.633	.618
Farmers are able to save	25.31	40.363	.359	.678
Farmers are able to educate their children.	25.00	42.800	.248	.699

Project Planning

Reliability Statistics

Cronbach's Alpha	N of Items
.700	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Farmers participated in project budget planning	23.19	40.296	.732	.725
The decision concerning seed selection was agreed upon by all the farmers.	23.06	37.129	.828	.703
Farmers were part and parcel of project goals and objectives.	23.44	38.529	.621	.735
Project extension activities were regularly conducted	23.25	43.267	.341	.784
Farming activities were supported by extension services	23.50	46.133	.248	.794
NARGIP team established demonstration sites among the CBOs' involved.	23.25	47.533	.237	.791
The feasibility study revealed project viability among the households selected	23.81	43.496	.528	.753
The household needs of individual farmers were prioritized in the feasibility	24.00	45.867	.500	.760

study as part of project planning				
Social and environmental assessment was compressively conducted	24.00	47.333	.294	.782

Capacity Building

Reliability Statistics

Cronbach's Alpha	N of Items
.782	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Farmers participated in project budget planning	21.19	43.496	.792	.822
The decision concerning seed selection was agreed upon by all the farmers.	21.06	43.796	.671	.838
Farmers were part and parcel of project goals and objectives.	21.19	48.029	.610	.843
Project extension activities were regularly conducted	20.81	46.029	.705	.833
Farming activities were supported by extension services	21.19	50.963	.558	.848
Through extension services, farmers are able to make informed decision the new technology of farming.	21.00	52.267	.479	.855
Farmers receive regularly support on marketing produce.	21.31	58.496	.142	.875
Farmers are taken to	21.25	53.800	.368	.864

educational tours The NARGIP project team holds regular farmer- exhibitions.	20.50	43.733	.877	.814
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Project Implementation

Reliability Statistics

Cronbach's Alpha	N of Items
.860	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Farmers were adequately equipped with seedbeds	21.31	60.629	.275	.895
Farmers were initially supplied with sufficient seedlings.	21.00	51.067	.724	.863
Farmers were supplied with all required fertilizers.	21.06	50.329	.688	.866
The soil was tested for the right amount of contents	21.25	48.600	.732	.862
Correct planting spacing was observed during the planting of the banana transplants.	21.50	52.800	.671	.868
Crop protection against diseases was done at the right time	21.19	53.363	.617	.872
Planting season is supervised by the NARIGP field support team.	21.63	53.050	.707	.865
Farmers are aware of the harvesting season.	21.13	53.983	.625	.872
Farmers are guided on harvesting techniques	21.44	52.796	.635	.871

Monitoring and Evaluation

Reliability Statistics

Cronbach's Alpha	N of Items
.884	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Farmers participated in project budget planning	22.00	99.333	.568	.956
CBOs' are accountable on the utilization of funds.	22.00	95.467	.775	.946
Disbursement of financial support is fairly shared among the farmers.	22.00	96.133	.747	.947
Farmers have data collection tools to aid in reporting in case of disruption to the crop as a result of disease or any attack (e.g. (ODK Collect).	22.06	91.796	.860	.941
NARIGP receive regular farmers' reports to make timely decision about the crop.	21.50	92.400	.886	.940
Farmers are capable to analyze and deduce from the data collected.	21.94	94.863	.839	.943
NARIGP have easy platform for sharing and reporting field data.	21.69	92.496	.868	.941
Regular meetings are conducted to deliberate on challenges experienced during growing of the crop.	21.63	89.983	.918	.938
Farmers have access to all information so as to improve on cultivation of crop.	21.69	91.829	.778	.946

