

**FARM LEVEL MANAGEMENT PRACTICES FOR
SUSTAINABLE FRENCH BEANS FARMING IN NYERI
COUNTY**

BY

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DECLARATION

This project is my original work and it has not been presented for a degree in any other university.

Signature 

Date 25th May 2020

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

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DEDICATION

This research project is dedicated to my parents, Lawrence and Gladys, whose constant reminder to define my dreams broadly and to pursue them authentically, aided the completion of this project.

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ABBREVIATIONS AND ACRONYMS

FAO	Food and Agriculture Organization
FLMP	Farm Level Management Practices
Ha	Hectare
HCD	Horticultural Crops Directorate
IFAD	International Fund for Agricultural Development
KALRO	Kenya Agricultural and Livestock Research Institute
KShs	Kenya Shillings
NCPD	National Council for Population and Development
pH	Power of Hydrogen
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for Development
WFP	World Food Program
WHO	World Health Organization

ABSTRACT

The transformation from agriculture to agribusiness remains an elusive goal for many of the farmers in Kenya. This is a similar situation to horticultural products which require high levels of maintenance and management. The inability to transform often leads to higher poverty levels and increased food insecurity which hinder sustainable development. The objective of this research was to analyze farm level management practices for sustainable French beans farming in Nyeri County. The specific farm level management practices that the research sought to analyze included; resource management, risk management, research and development. The four capital model acted as the guide and the anchoring theory for this research. The research adopted a descriptive survey design to enable wide reach of the population and the study of various variables. The target population for the study was 850 French beans farmers. From this the research selected a representative sample of 265 farmers. The research collected data using self-administered questionnaires. The collected data was evaluated using descriptive and inferential statistics through the statistical package for social sciences software. The research presented the findings of the research in tables. The research employed regression analysis to establish the influence of the dependent variable-sustainability on the independent variables-resource management. The findings of the research revealed that farm level management practices had a positive influence to the sustainability of the French beans farm in Nyeri County. The lack of the adoption of these practices resulted in low yields for the farmers. Therefore, the study recommended that the farmers receive training and support on how to take their farms as businesses and help them shift to agribusiness. The training would help the farmers irrespective of their education level as they would act as tools of information dissemination and communication which would contribute to the sustainability of the French beans farm.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Ever since the agricultural revolution, the world has experienced a fair share of agricultural advancements. Despite this, the world has witnessed little progress in the field of sustainable agriculture. Reports indicate that the number of hungry people in the world is increasing partially owed to the presence of defects in this system (Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), United Nations International Children's Emergency Fund (UNICEF), World Food Programme (WFP) and World Health Organization (WHO), 2018). Further, it is human nature to want more value even when it is at the cost of future generations. In an attempt to find a solution, scholars have brought about the concept of Farm Level Management Practices (FLMP).

In Kenya, agriculture is one of the key engines to agricultural growth. The United States Agency for Development (USAID) (2014), acknowledged that 70 percent of Kenyans get total or part of their income from agricultural activities. Despite this, the country has experienced stagnation of growth in the sector resulting to high levels of poverty and food insecurity. A USAID report, indicated that over two million people in Kenya would require food assistance by the end of July 2019. There are several challenges that have led to this stagnation and food insecurity among them the depreciation of the land quality in the country. Studies indicate that that only 20 percent of Kenya's land is suitable for farming. The utilization of this land is however inefficient (USAID, 2014). The country has also fallen victim to constant drought as the rainfall levels fall below average. The over reliance on rain fed agriculture has further escalated the problem.

With the increase in population, urbanization and a rising middle class, agriculture continues to be one of the most promising industries in an otherwise troubled global economy (Ahumada & Villalobos, 2009). However, to achieve success in the sector, operations within the agricultural field need to be strategic and properly managed to maximize returns for the consumer, producer and future generations (Kahan, 2013). Managing production at the farm level is of utmost importance since without this, the farmer would experience low yields and low returns. In a republic where agriculture is the pillar of the economy, diversity on farming ideologies and maximization of produce is not a new occurrence (Irungu & Moronge, 2016). However, the changing dynamics in food production leave minimal room for mistakes and require that standards for efficient farm management practices are set. These standards should reflect the diversity of different farm management styles. Thus, this research focused on farm level management practices in Nyeri County that would promote sustainable French beans farming.

The anchoring theory of this study was the four-capital model developed by Ekins (1992). The model revolves around balancing human, manufactured, financial and natural capital to create and maintain sustainability. Farm managers should analyze the equipment, tools, buildings and infrastructure necessary to boost productivity. They should also analyze the education, skills and well-being of the human resources as is the requirement for human capital. Additionally, farm management should put into consideration the general welfare of the society in the daily activities to achieve sustainability in the end. A French beans farm requires these four types of capital for maximum and sustainable yields. These are representatives of the factors of production, which are part of the four-capital model and

they call for proper farm level management. An imbalance in one of the aforementioned aspects has detrimental effects to sustainability of French beans farming.

1.1.1 Farm Level Management

Farm level management is the administration of farms, which entails manipulating available labor, land, and capital in order to achieve maximum productivity within the food chain (Kahan, 2013). The modern-day consumer is concerned with food production and its impact to the environment (Ucello, Kauffmann, Calo & Strissel, 2017). This dramatic change in the consumption patterns demands that a farmer understands the needs of the market and translates this to individual strategies and skills beginning from the farm level (Mullen, 2002). Poor farm level management practices result in substandard yields, which are detrimental to the creation of sustainable agriculture. The farmer as the main controller of the factors of production has to ensure that the farm remains profitable and productive (Dinampo, 2017). On the other hand, the farmer ensures that individual goals and objectives do not interfere with the resilience of the agricultural system for the purpose of future generations.

As a result, it is essential for the modern-day farmer to learn the art of resource management that involves a lot of risk taking and decision making due to the outcome uncertainty. In short, farmers need to become business managers. They must focus on the diverse production methods, the product itself, the costs involved and the expected returns (Mullen, 2002). Farm level activities that require management include; tilling of land, planting, crop maintenance activities, harvesting, post-harvest management and land enrichment

activities (Mullen, 2002). The appreciation and effective implementation of proper farm level management results in satisfactory productivity at the farm level.

1.1.2 Agricultural Sustainability

Sustainability refers to the ability to maintain entities, outcomes and processes in the long term. The concept of sustainability is threefold- economic, social and environmental sustainability (Rosen, 2017). Economic sustainability focuses on the ability of the primary producer to derive maximum utility from an entity continuously. Social sustainability focuses on the desires of the current and prospective stakeholders of the entity. Environmental sustainability ensures that ecological resources of an entity is capable of fulfilling the desires of the current and future populations.

The environment is one of the most important assets of farming. Thus, agricultural sustainability focuses on developing techniques that have minimal negative outcomes on the environment. The techniques have to be readily available to the farmer to ensure success of the strategy. Further, it aims at improving food productivity in terms of the quantity and quality bringing into perspective economic sustainability (Pretty, 2008). An agriculturally sustainable system has to be resilient and persistent. This means that it should be highly capable of buffering shocks and have the ability to continue over long durations (Amekawa, 2010). This study will use resilience and persistence in terms of the yields of the French beans farming practices to measure sustainability. The study puts into account the economic, social and environmental yields when measuring resilience and persistence.

These include operational efficiency of techniques, financial status and resource management.

1.1.3 French Beans Farming in Nyeri County

Nyeri County has favorable agricultural and climatic conditions in comparison to other counties. The standard small-scale farm size in the county is 0.7 hectares while the average large-scale farm size is 1.8 hectares. Approximately 60,662 hectares are under food crop production. Initially, most of the farmers practiced both crop and animal farming but as economic times and climatic conditions change, a shift to specialty farming has been evident. The major crops include coffee, tea, maize, beans, potatoes and horticultural crops (Kimani, 2014). In 2014, the county's crop produce was at KShs 6,937.59 million where 42 percent was from horticultural products, 21 percent from maize and 16.5 percent from potatoes (Irungu & Moronge, 2016).

The Kenya Agricultural and Livestock Research Organization (KALRO), notes that the current export demand for French beans are much higher than Kenya's produce. As a result, farmers are constantly encouraged to venture into the trade. It is evident that horticultural products are the main source of income in Nyeri's agricultural sector. French beans grown in Nyeri County are mainly for export purposes as only 10 percent of the produce is consumed locally (Horticultural Crops Directorate, 2014).

The European Union is the key marketplace for these beans (Dag, 2003). Commercial French beans farming became a common business venture in early 2009 when export

companies sponsored some farmers in the county towards the initiative. They provided the seeds and facilitated farmer training on maintenance and growth of the crop (Horticultural Crops Directorate, 2014). Further, they acted as the link between the farmer and the market. More farmers gradually joined as it was viewed a profitable venture. Although there are farmers who practice French beans farming all over the county, it is widespread in Mathira and Kieni constituency. The average area under French beans farming is 0.85 ha per farmer where the estimated produce is usually about 3.4 tons per area per season.

Majority of farmers in the county depend on rain as a source of water for the crop. However, the changing climatic conditions and the French beans demand during times of little or no rain have forced the farmers to look for alternative water sources. This has led to the use of sprinkler irrigation to ensure the vegetables get adequate water throughout their growth period. Those whose land is near rivers use drip irrigation. There are three varieties mainly grown in Nyeri; the green, yellow and purple French beans.

1.2 Problem Statement

The FLMP are crucial towards sustainable farming. Gray, Parker and Kemp (2009) acknowledge the importance of incorporating management, decision-making and problem solving into the farm management discipline. Further, Malcolm (2004) suggests that economics has to be part of farm management practices in order to develop sustainable agriculture. The food poverty levels in Nyeri stand at 26 percent with some constituencies receiving relief food annually. This is due to the inadequate utilization of farm inputs, over-dependence on rain-fed agriculture, ineffective agricultural practices and natural calamities

(Kimani, 2014). The county's agricultural potential is a pathway to entrepreneurial ventures and food security, which will contribute to the overall economic development (National Council for Population and Development, 2017).

In 2014 alone, the county's French beans exports were worth KShs 623.45 million. However, these proceeds have been declining over the past three years as farmers continue to quit the trade. For instance, in 2017, the export value had declined to KShs 16.36 million (HCD, 2017). The decline in French beans farming is due to the perceived riskiness of the crop. Farmers accuse export companies of rejecting crops with slight spotting because of pest and diseases. The implication of this is huge losses that have caused farmers to opt out of the business. The county government is aware that if these farmers are applying poor farming methods, then the produce will be of low quality. Additionally, farmers are reluctant to make use of other methods that could provide water for their crops. Those that are bold enough lack enough financial and technical facilitation on the alternative methods. Consequently, only a few farmers are able to sustain French beans farming businesses in the county.

In alignment with the big four agenda of the national government, the county government has drawn up pillars that will act as a boost for its agricultural sector (Nyeri.go.ke, 2019). The first pillar focuses on increasing production levels by training farmers on the use of machinery, farm inputs and irrigation techniques. The second pillar aims at bettering the quality of produce and decreasing post-harvest loss by training farmers on alternative storage methods. The third pillar seeks to ensure that farmers have unlimited access to the

market for their produce. The fourth pillar is towards the enhancement of extension services that will see farmers receive proper facilitation about their farming activities. Thus, this study was timely since it pursued the management practices at the farm level to ensure sustainable French beans farming within Nyeri County.

There are various studies both locally and globally on farm management practices and sustainability. Makinen (2013), focused on the impacts of managerial thinking on farm profitability. He only looked at the financial aspect of a farm business, which is not the only factor that influences agricultural sustainability. Devaux, Torero, Donovan and Horton (2018), focused on the relationship between research and sustainable agriculture. Research is an important aspect of consideration when it comes to agricultural sustainability. However, it has to work together with the financial, environmental and social branches for maximum sustainability. Vukelic and Rodic (2014), focus on farm management on the basis of agricultural success. The study fails to take into account the sustainability of the entire business. Ochieng, Owour and Bebe (2013), seek to find out if poor farm management practices specifically extension services would influence agricultural productivity. From the above, it is evident that the studies do not demonstrate the relationship between FLMP and sustainable French beans farming. Most of the studies concentrate on one branch of sustainability. The studies leave out the important part of an all-encompassing agriculturally sustainable plan. Additionally, there are few studies conducted on French bean farming in Nyeri County. Most studies focus on Kirinyaga County. Thus, this research aims at filling these gaps.

1.3 Objectives

The general objective of this study was to review farm level management in respect to the role that it played in sustainable French beans farming in Nyeri County. The specific objectives were to:

- (i) Establish status of French beans farming in Nyeri and production per acreage.
- (ii) Establish farm level management practices adopted in French beans farming.
- (iii) Determine the relationship between farm level management and sustainable French beans farming.

1.4 Value of the Study

This study endeavored to provide economically viable and practical suggestions for the agri-business management sector in Nyeri County. This study provided information on French beans farming and the farm management practices required to achieve sustainability. This information would be useful for small scale, large scale and aspiring farmers as they would be able to derive best practices for running a farm as a business. They would also get to understand how to transform their meager incomes into profitable businesses without depleting resources useful for future generations through the implementation of FLMP. The study also aimed at providing information on the best practices to ensure that the French beans produced created value for the end consumer.

The research also provided policy makers with information on farm level management and its relevance to ensuring sustainability. As a result, they would be able to come up and implement strategies to drive growth of the French beans farming sector, which would in

turn lead to increased value, food security and employment creation. The study also provided vital information for other research who plan to look into farm level management from a business point of view. It also served as a basis for further research on farm level management practices with focus on other crops aside from French beans and types of farming in other counties.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Globally, agriculture depends on factors such as availability and management of resources, climatic conditions and demand in the market (Kahan, 2013). This chapter presents literature on FLMP across the globe, regionally and locally as reviewed by past research. It discusses the theoretical framework upon which the concept of sustainable farming emanates from. Further, it gives a detailed review of French beans farming and the farm management activities that surround the trade. The chapter also gives an empirical review of existing literature and identifies knowledge gaps that would lead to better farm level management and eventually sustainable farming if bridged. Another subject of discussion is the conceptual framework alongside an empirical review expounding on the relationship between the independent and dependent variables of the study.

2.2 Theoretical Perspective

It is important to note that there is no such thing as a unified theory of farm level management as it comprises of diverse processes. This section assessed the fundamental theories and models supporting FLMP for sustainable farming. The focus of the study was the four-capital model, sustainable agriculture theory, new theory agriculture and the actor network theory.

2.2.1 Four Capital Model

Ekins (1992), developed the four-capital model, which comprises of financial, manufactured, natural and human capital. Capital is anything that has the potential of increasing value of a process, project or entity. The four type of capital work together to

achieve financial, social and environmental sustainability. Financial capital involves investment and cash utilization decisions. The management determines the type of resources necessary to run the business, their costs and acquisition of the finances to meet these needs (Ekins, Dresner & Dhalstrom, 2008). Human capital deals in the procurement, training and maintenance of labor resources. The human resources need to be well trained, motivated and of good physical standing to achieve maximum productivity and sustainability (Ekins et al., 2008). It also focuses on building social networks through socially responsible initiatives. Natural capital takes into account all the players in the eco system (Eizenberg & Jabareen, 2017). It ensures that the activities of the business will not have detrimental effects to environmental sustainability. Thus, the materials used for French beans farming should not interfere with the natural settings of resources such as soil. If they interfere with these, then the farm manager is responsible for ensuring that there is a plan such as crop rotation to eliminate the imbalance. Manufactured capital deals in the equipment, tools and infrastructure needed to ensure maximum yields. These include incorporation of technology and infrastructure into a business (Brons & Oosterveer, 2017).

Sustainability in French beans farming begins with a balance between these four types of capital. It is impossible to achieve this without proper FLMP. These are the major enablers of a balanced four-capital system and consequently sustainable French beans farming. Studies reveal that farmers put so much focus on financial capital to maximize returns (Eizenberg & Jabareen, 2017). While this is normal human behavior, it easily leads to the misuse and eventually depletion of other forms of capital. Brons and Oosterveer (2017), suggest that too much attention on one aspect may lead to neglect of the other ultimately

causing an imbalance that interferes with sustainability. Thus, a farm manager must ensure that the decisions made in the farm are reflective of a balance between the four types of capital.

2.2.2 Sustainable Agriculture Theory

Sustainable agriculture theory became famous in the 1980s courtesy of the agricultural scientist McClymont. The theory recommends farming practices that acknowledge ecological maintenance (Udemezue & Osegbue, 2018). The theory anchors towards a system that can provide food in the long term. It emphasizes on the absence of artificial farm inputs in the attempt to achieve this goal (Kimani, 2014). It also advocates for the innovation and use of cost-effective agricultural techniques, which include the use of renewable energy sources (Pretty, 2008). This ensures that farm practices employ natural biological cycles eventually leading to sustainable agriculture.

Farm managers should adopt ecological friendly farming practices to ensure viability of French beans farming for generations to come. Most farm managers neglect the ecological perspective of farming. This is not entirely the fault of the farm manager since it is part of their job to maximize return on investment. It results in loss of biodiversity and eventually sustainability. An ecologically imbalanced farm will experience low yields since the environment is a key driver towards productivity of the farm. An effective manager therefore should put in place strategies that measure sustainability within the farm to ensure that they do not cross the intended borders in their bid to achieve maximum returns.

2.2.3 Actor Network Theory

The actor network theory brought forward by Callon, Latour and Law (1984), suggests that entities are made of various interconnected networks that work together for its success. The theory suggests that stakeholders (actors) within a business connect through networks. A network is an independent entity, which rarely works without connection to another (Grando et al., 2014). Wellenbrock (2013), further defines a network as a specific type of relationship that links people, objects or even events. It is important to note that the theory gives an equal measure of importance to all players in the network. The theory further suggests that products undergo a variety of processes before they become valuable to the end user. The network theory views these business processes as part of horizontal and vertical relationships all, which contribute to sustainability (Grando et al., 2014).

Thus, the key players in the business have to make a myriad of decisions to ensure resilience and sustainability. First, the manager assumes the role of sustainability translator and mobilizes. The implication of this is that he becomes responsible for communicating sustainability points with the major actors. All the activities to ensure that French beans grow and are ready for the market therefore intertwine. The failure of one FLMP otherwise known as a network in this case easily leads to faulty practices. Additionally, the failure of one actor in this case farm managers, farm hands or even supervisors leads to disruption of sustainability. A farmer should for that reason make farm management decisions that align with the ultimate sustainability goal. In essence, without the adoption of proper FLMP, sustainable agriculture would be non-existent. For instance, if a farmer makes a decision against irrigation and the rains fail, the quality of the crop is affected. It distorts the entire

farming season; from the farmer's expectation to the end consumer's needs. Hence, understanding the connection between all farm level activities through the network theory leads to sustainable French beans farming practices.

2.2.4 New Theory Agriculture

The King of Thailand introduced new theory agriculture in 1997 after the country underwent a deep crisis because of an economic meltdown. The main aim of this theory was to set up proper land and water management practices that would ensure sustainability. He suggested that sustainability begins with the farmer being self-reliant (Raweevan & Suuksa-ard, 2011). To achieve this, a farmer has to sub-divide the land appropriately. Water resources should also be readily available. The farmer should also be educated on the variety of crops to plant; whether to practice integrated farming or mono cropping (Adekunle & Fatunbi, 2014). However, the king advocated for integrated farming. From there the farmer can then be able to provide beneficial products to the whole community while still enjoying the same.

The new theory agriculture is significant to this research as water and land are two vital resources towards the achievement of sustainability in any agricultural venture. Farmers in some areas have quit French beans farming due to inadequate water supply. Others are not enlightened on the proper methods for French beans farming leading to losses and deficiency. Additionally, this theory provides remedies for damaged natural resources, such as the soil in Nyeri County, which is an essential farm level practice for smallholder farmers (Raweevan & Suuksa-ard, 2011). The adaptation of proper land and water

management practices coupled up with French beans farming extension services is imperative for the establishment of sustainable French beans farming.

2.3 Empirical Review

Several research both globally and locally have studied agricultural sustainability. Some have been general studies while others have laid an emphasis on sustainability for particular crops. Globally, Makinen (2013), studied the relationship between farm management decisions and farm profitability. He surveyed 117 Finnish dairy farms and their records. Through the structural equation modeling, he found that farmers, who exercised managerial thinking, were more likely to have profitable farms. However, managerial thinking did not necessarily mean that the management process was effective. The study did not look at specific farm level management neither did it focus on the social, environmental and economic perspective of sustainability; rather it focused on farmer's decisions that portrayed a managerial way of thinking. For a farmer to enjoy long-term profitability, it is necessary to analyze all the components of sustainable development.

Devaux et al. (2018), studied the relationship between agricultural research and sustainable agriculture. To establish the degree of correlation between these two variables, the research used secondary data. They reviewed literature from previous studies and established that farmers who implemented findings from research studies were more likely to have a sustainable value chain than those who did not. The study put into account the three pillars of sustainability, which benefit from research. However, the study only dealt with research

in agriculture, which is a single FLMP. Several other farm management practices contribute to sustainable farming practices.

Agula, Akudugu, Dittoh and Mabe (2018), studied the relationship between sustainable agriculture and eco-system-based farm management practices. The research used primary data from 300 households in Ghana. The study acknowledged that FLMP were crucial to the achievement of sustainability in agriculture. Further, the study discovered the factors necessary in promoting the adoption of eco system-based farm management practices, which result in sustainability. The study mentioned a few of the considerations and decisions a farm manager had to make to enhance sustainability. However, the study demonstrated a bias on the ecological side of sustainability. It did not put into consideration the economic and social sustainability aspects.

Vukelic and Rodic (2014), studied the relationship between farmer's management capacities and agricultural success, which translates to sustainability. The study was a review of secondary data sources. They found that management capacity of the farmer was vital for the agricultural success of the firm. Further, farmers who have management capacities tend to view the farm as an entrepreneurial venture more than those who do not. The term agricultural success incorporates sustainability in this study. Nevertheless, this study did not go into detail about FLMP that led to sustainability.

Locally, Odero, Mburu, Ackello and Nderitu (2013), analyzed the smallholder value chain of snap beans production in Kirinyaga County. The aim was to determine the impact of

proper management practices within a French beans value chain to competitiveness in the Agricultural sector. The research was through household surveys and questionnaires. They found that the number of players of a value chain influences its competitiveness and consequently its sustainability. A reduced number of intermediaries in the value chain would promote sustainability. The research however, did not cover farm level management as part of sustainable French beans farming that the current study will cover.

Ochieng, Owour and Bebe (2013), studied the management practices and challenges in chicken farming in western Kenya. The objective of the study was to determine whether poor farm management practices specifically application of extension services knowledge were a major cause of poor productivity. The study used primary data to gain deeper insights on the variables of the study. It found that improper conveyance of farm extension services led to a decline in the profitability of the chicken farming venture. This suggests that there is a relationship between farm management practices and profitability. Nonetheless, the research only focused on profitability where it did not specify whether it was long-term or short-term. Thus, it did not focus on sustainable farming.

Odhiambo (2013), studied the competitiveness of small-scale French beans production in Kirinyaga County, Kenya. The objective of the study was to determine if value added activities in agriculture had any impact on key players and whether it increased farmer competitiveness. A random sample of farmers and consumers had questionnaires administered to them. To collect information from the other agricultural players, the research used focus groups and interviews. The research found that French beans farming

remains competitive irrespective of the number of players. However, to increase its competitiveness, farmers should consider continuously adding value to the activities carried out at the farm level through managerial thinking. The study solely focused on competitiveness, which is not the only important factor in achieving sustainability. Further, it did not specify on FLMP rather, it only discussed value added activities.

2.3.1 Farm Level Management Practices in French Beans Farming

Various authors in the management discipline have outlined planning, organizing, leadership, coordinating and controlling as the major functions of management (Malcolm, 2004). These functions work together in farm level management for the ultimate success of the agricultural business. French beans farming is a labor-intensive trade. The management practices at the farm level mainly focus on resource, risk management, research and development (Rose et al., 2019). They are all evident in the different stages that French beans undergo before they are ready for the market.

French beans farming requires the management of financial, water, land and human resources. Most importantly, a farmer should adopt risk management practices (Rose et al., 2019). Thus, adequate planning is necessary prior to commencement of the entire project. Besides being a labor-intensive trade, French beans farming also requires high capital investment. Farmers make decisions on whether to purchase or rent land, what type of structures to put up, labor costs and input costs.

Finances in the farm are required for putting up appropriate structures such as the green houses and grading sheds (Tiwari & Chaubey, 2013). Green houses are where the planting

and growth takes place. These require poles if the farmer plants the climbing varieties. The grading sheds provide shelter for the French beans after harvest waiting grading. Finances also help in the acquisition of certified seeds and maintenance of all the other resources below, important for the sustainability of the French beans trade.

Land management activities entail land preparation, crop rotation, pest and disease, harvest and post-harvest management (Gray, Parker & Kemp, 2009). First, land is ploughed and harrowed before planting begins. It is important that a farmer learns of the type of soil, power of hydrogen (pH) levels and nutrient content. Manure and fertilizer application for French beans is before planting. Weeding is 2-3 weeks after planting to remove any unwanted growth (Tiwari & Chaubey, 2013). Farmers are to be extremely careful during this time to avoid weeding when the field is wet as this can lead to spread of diseases. It is evident that French beans are a very sensitive crop therefore, it is necessary to spray them with appropriate pesticides during weeding to prevent attack. Land management also involves the farmer understanding the importance of crop rotation to avoid nutrient deficiency in the soil. It also helps in avoiding pest and disease build up.

Human resources are one of the most essential components of a sustainable value chain. They should constantly receive training on the expectations and rules of work (FAO, 2014). French beans farming employees should have an understanding of planting, gardening, flowering, harvesting and grading of French beans. Further, it is imperative that they are conversant with the high hygiene levels required for French beans farming. Harvesting begins 6-8 weeks after planting. During this stage, proper human resource management

skills are of utmost importance. Close monitoring of harvesters is necessary to ensure that clean harvesting equipment are used, personal hygiene is observed and the pods are properly picked without damages. Training comes in handy in salvaging situations that may lead to massive losses. For instance, French beans harvested under wet conditions automatically do not meet the required standard if packed in that state (Tiwari & Chaubey, 2013). However, this situation is rectifiable through placing the French beans on a clean cloth under a shade and allowing drying. If an employee is not aware of such a strategy, avoidable losses may occur.

As earlier mentioned, French beans, require adequate water supply. A farmer should therefore make decisions on the best water resources to put to use. Areas that have a regular rainfall pattern can depend on rain fed farming while those that do not have depend on irrigation (Dag, 2003). However, solely depending on rain may fail the farmer due to the ongoing climate change experienced all over the world. Thus, it is imperative for a farmer to choose wisely. The type of irrigation is another decision area requiring careful thought. The farmer through proper analysis of the type of soil and its characteristics determines the best irrigation method, which includes but is not limited to basin, furrow and overhead irrigation.

Risk management is an important concept when it comes to any business venture. Farmers are able to better anticipate problems through risk management (Kahan, 2013). French beans are a high-risk crop. Farmers have incurred huge losses from simple operational mistakes. Common risks in French beans farming include; weather changes, pests and

diseases, excessive borrowing and government export policies. In addition, most French beans farmers in Nyeri County specifically, are unable to separate the farm as a business and their household needs. The imbalance here becomes a financial risk, as it is very easy for the farmer to misuse finances meant for the business leading to collapse of the value chain. A value chain cannot be sustainable if the farmer continuously makes losses (Najera, 2017). Therefore, insurance policies for French beans farmers are crucial in ensuring continuity of production. The farmer has to make a decision on the best insurance policies for their individual enterprise.

Research and development in the establishment of sustainable French beans farming is an area often overlooked. To achieve agricultural sustainability, a farmer should exhibit thirst for information on the French beans business. Research results in the identification of new technologies and ways of conducting businesses. Research can begin simply by engaging agricultural extension services (Kimani, 2014). Here, the farmer and employees learn more about French beans. They are also able to identify wrong practices and take the initiative to adjust accordingly. In the process of adjusting, a farmer may come up with new methods that are viable and applicable for the whole French beans value chain contributing to the body of agricultural research and development.

Since farmers are managers, bench marking is of utmost importance. Paying visits to other areas where French beans farming is doing better and identifying helpful practices ensures the overall development of individual farms. For instance, Kirinyaga County is the leading exporters of French beans meaning that farmer have mastered the trade. It would be a

helpful management initiative for a farmer from Nyeri County to visit Kirinyaga and get some lessons from there. Further, farm managers should be quick to research on trends in the market place to ensure that they produce for the market and avoid losses (Najera, 2017). Farmers must therefore also become research and development managers for agricultural sustainability.

2.3.2 French Beans Farming and Production

French beans are horticultural crops grown by both small and large-scale farmers all over the world. These crops vary in color and growth habit. They can be green, yellow or purple. Further, they exhibit a dwarf or a climbing growth habit and are nutritionally rich. French beans do well in areas with altitudes of between 1500-2100m. They also require well-distributed rainfall patterns as production mainly depends on availability of water. If an area has an unreliable rainfall pattern, farmers use irrigation as the crop requires up to 50mm of water every week. Loamy and clay soils with an optimum pH of 6.5 to 7.5 best support the growth of French beans.

The crop is highly prone to attack by pests and diseases, which can ruin an entire harvest. The major pests and diseases include; root knot nematodes, bean fly, bean thrips, American ball worms, aphids and red spider mites. Harvesting under wet conditions may destroy the beans. It takes place approximately six to eight weeks after planting. It is imperative to maintain high levels of hygiene to avoid spoilage. Farmers who have used the recommended seedlings harvest about fifteen tons per hectare. This translates to 200-600 kilograms of French beans from 1kg of seedlings. After harvest, the beans should be stored

away from direct sunlight and in extremely hygienic conditions. It prevents post-harvest diseases that can lead to loss of an entire shipment.

2.3.3 Farm Level Management Practices and Sustainable French Beans Farming

Sustainable agriculture is the sum of all management activities from planning, organizing, controlling, coordinating, directing and staffing at the farm level (Emilal, Dominique, Cravero & Tanquerey-Cado, 2014). It is multi-dimensional. A farmer has to understand the whole concept of sustainability and the role they play to be able to participate in it.

Studies indicate that most farmers from Nyeri County have continued to ignore FLMP (Irungu & Moronge, 2016). However, this is subject to debate since it is not even clear whether they understand the sustainability concept. Most of these farmers are interested in meeting their daily needs. They barely understand that they are part of a greater chain. They concentrate more on the short-term goals rather than the long-term goals of the French beans business.

Non-implementation of management strategies in the farm ultimately results in undesirable agricultural practices (Recha, Kapukha, Wekesa, Shames & Heiner, 2014). Exporters reject crops and if they make it past that stage, they are not of maximum value to the end consumer. The farmer will have a product to sell at the end of the day but still the chances of them quitting the trade are extremely high. They do not derive maximum value from the trade since the yields are low, the quality of the land is continually deteriorating, and there are massive losses, numerous labor problems and so on and so forth (Roko & Opusunju,

2016). On the other hand, the consumer is dissatisfied and breaks the chain from the demand end. In the end, there cannot be a stable supply chain as the value chain is full of wrangles from the key players. These observations confirm that agricultural sustainability is dependent on proper farm management practices.

2.4 Summary of Empirical Review

Despite the numerous studies made on farm management and agricultural sustainability there were weak linkages between these two variables. Most studies point towards either farm management or agricultural sustainability. It is imperative for farm managers to recognize the link between agricultural sustainability and embracing management practices in the farm. This research addressed these concerns.

Table 2.1 Summary of Literature Review

Author(s)	Study Topic	Objectives	Research Methodology	Findings	Knowledge Gap(s)	Focus of Current Study
Makinen (2013)	Farmer's managerial thinking and management process effectiveness as factors of financial success on Finnish dairy farms.	Analyze the impact of farmer's managerial skills, thinking and decisions to profitability of the farm.	Structural equation modeling on surveyed data.	There was a significant relationship between managerial thinking and decisions to farm profitability.	Does not focus on sustainability rather it focuses on profitability, which is just a small part of the entire agricultural sustainability concept.	Capitalize on the adoption of farm level management practices that will enhance sustainable French beans farming.
Devaux et al. (2018)	Agricultural innovation and inclusive value-chain development: a review.	Review the relationship between agricultural research and sustainable farming.	Secondary data by reviewing recent literature on agricultural value chains.	Agricultural research has a positive effect on the agricultural sustainability.	Did not focus on FLMP.	Addresses various farm level activities that act as a key driver for sustainable French beans farming.
Vukelic and Rodic (2014)	Farmers' management capacities as a success factor in agriculture: Review.	Determine whether farmer's management capacities impact agricultural success according to previous research.	Secondary data from previous research articles.	Farmer's management capacities are a crucial success factor when it comes to successful agriculture.	The study failed to address FLMP in detail.	Capitalizes on the adoption of FLMP that will enhance sustainable French beans farming.

Table 2.1 Continued

<p>Agula, et al. (2018).</p>	<p>Promoting sustainable agriculture in Africa through ecosystem-based farm management practices: evidence from Ghana.</p>	<p>Determine the relationship between sustainable agriculture and eco-system-based farm management practices.</p>	<p>Primary data through key informant interviews, focus groups and semi structured questionnaires.</p>	<p>Acknowledged that FLMP were crucial to the achievement of sustainability in agriculture.</p>	<p>It did not put into consideration the economic and social aspects of sustainability.</p>	<p>Seeks to give an all-encompassing view of sustainability to ensure sustainable French beans farming practices.</p>
<p>Odero et al. (2013)</p>	<p>Value chain analysis of smallholder snap beans production in Kirinyaga County, Kenya.</p>	<p>Analyze the impact of managing a French beans value chain to competitiveness and consequently sustainability in Kirinyaga County, Kenya.</p>	<p>Surveys and questionnaires.</p>	<p>Ineffective management of a value chain makes it longer which results in lower benefits thus less competitiveness and sustainability.</p>	<p>The study mainly focused on management along the entire value chain. It did not focus on FLMP as a gateway to sustainable French beans farming.</p>	<p>Involves analyzing FLMP that result in sustainable French beans farming practices.</p>
<p>Ochieng et al. (2013).</p>	<p>Management practices and challenges in smallholder indigenous chicken production in Western Kenya.</p>	<p>Determine whether poor farm management practices specifically application of extension services were a major influence to productivity.</p>	<p>Primary data specifically focus group discussions and interviews.</p>	<p>Improper conveyance of farm extension services led to a decline in the profitability of the chicken farming venture.</p>	<p>Only focused on profitability where it did not specify whether it was long-term or short-term. Thus, it did not focus on the entire scope of sustainable farming.</p>	<p>Seeks to give an all-encompassing view of sustainability to ensure sustainable French beans farming practices.</p>

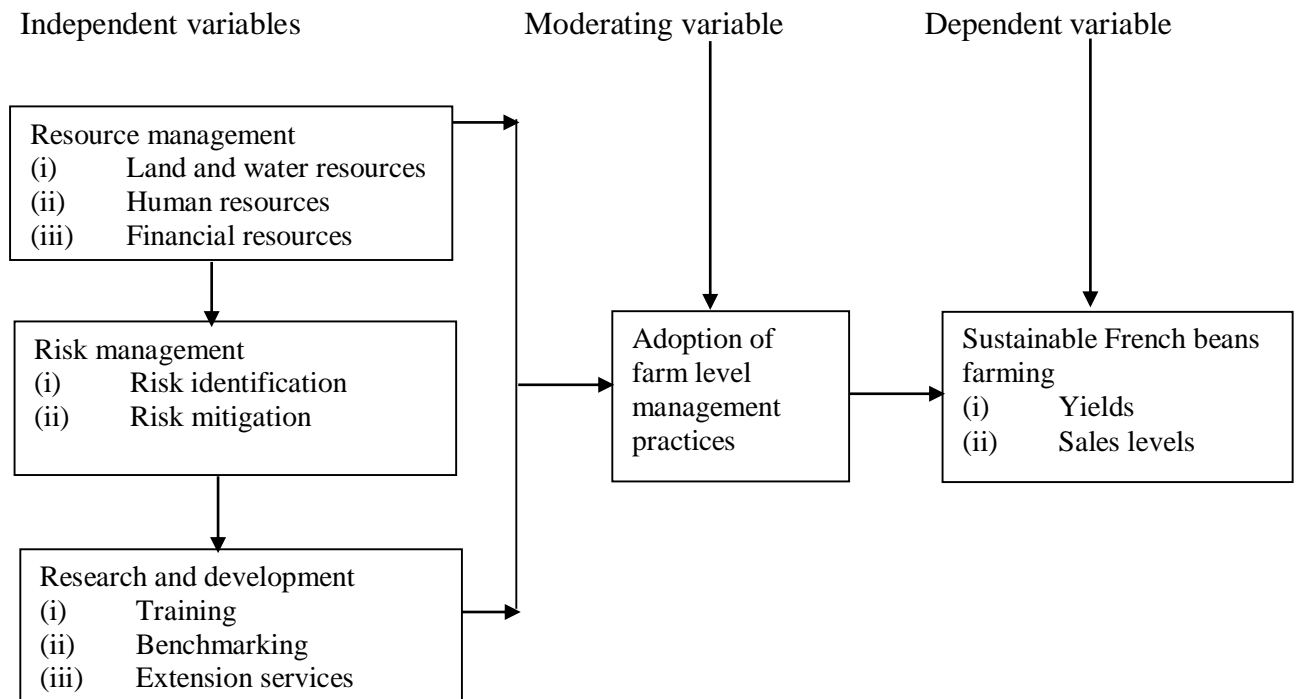
Table 2.1 Continued

<p>Odhiambo (2013)</p>	<p>Competitiveness of smallholder snap beans production in Kirinyaga County, Kenya.</p>	<p>Assesses the impact of value-added benefits to snap beans farming. Further, it assesses the relationship between competitiveness of small-scale farmers and value-added activities along the supply chain.</p>	<p>Primary data through semi structured questionnaires, focus groups and interviews were the techniques used.</p>	<p>Value added benefits provided an advantage to agricultural players irrespective of their number. However, if farmers employed managerial thinking at the farm level, then they would reap more benefits.</p>	<p>Solely focused on competitiveness, which is not the only important factor in achieving sustainability. Did not specify on FLMP rather, it only discussed value added activities.</p>	<p>Employs an all-encompassing method of analyzing sustainability to ensure sustainable French beans farming practices.</p>
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2.5 Conceptual Framework

The study adopted the conceptual framework illustrated in Figure 2.1 below. The independent variable was FLMP, which included resource management, risk management, research and development. Resource management entailed the proper management of land, water, financial and human resources. Risk management entailed the identification of potential risks and drawing up ways to mitigate them. Research and development included training, innovation, extension services and benchmarking. The dependent variable was sustainability, measured by the ability of a French beans farmer to reap high yields constantly, which translated to higher returns. The adoption or lack of it for the independent variables can alter the direction of its relationship with the dependent variable, hence, the use of the moderating variable in the conceptual framework.

Figure 2.1 Conceptual Framework



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The contents of this chapter outlined the methods for conducting this research. They included the research design employed, target population, sample size and techniques, data collection and data analysis techniques.

3.2 Research Design

The study adopted a descriptive research design. Through this method, the research reached more respondents and adequately studied the variables and their relationships. The data collected was of both primary and secondary nature. To extract primary data, the research administered questionnaires to respondents. Government sources, reports and books aided in getting secondary data. The descriptive research design was cost efficient and allowed the research to collect extensive information about the target population. It was also the best method given the time constraint for this research.

3.3 Population

The study targeted both large-scale and small-scale French beans farmers in Nyeri. The county has eight sub counties namely, Kieni East, Kieni West, Mathira East, Mathira West, Nyeri Central, Othaya, Tetu and Mukurwe-ini (Nyeri.go.ke, 2019). It has 693,558 people where 85 percent (589,524) practice farming. Out of these 7 percent (41,266) are involved in horticultural farming. According to the Nyeri County government agricultural division, approximately 850 farmers are involved in French beans farming. These were the target

population for the study. Village elders and agricultural officers helped in identifying the households that practiced French beans farming.

3.4 Sample Size Determination

The Krejcie & Morgan table (1970) aided in determining the sample size of the study. The representative sample was 265 farmers as shown in Table 3.1 below.

Table 3.1 Sample Size

Sub-County	Number of French Beans Farmers	Sample Size
Kieni East	200	62
Kieni West	175	54
Mathira East	300	93
Mathira West	120	37
Mukurwe-ini	10	3
Nyeri Central	10	3
Othaya	15	6
Tetu	20	7
Total	850	265

3.5 Sampling Procedure

This study adopted random sampling to determine the farmers who would take part in the study. This method is under non-probability sampling methods. It ensured adequate representation of every stratum in the results.

3.6 Operationalization of Variables

This section analyzed the indicators of the variables used in this study. The FLMP were the independent variables, which include, resource management, risk management and research and development. The indicators of resource management were land management, human resource and financial management all that used the nominal scale of measurement. The indicators under risk management were risk identification and risk mitigation

measures, which also employed the nominal scale. Research and development indicators were the presence of regular training, frequency of extension services, benchmarking and adoption of innovative techniques in the farm. These also employed the nominal scale. Quantity and quality of yields indicated the sustainability of farming which was the dependent variable. These employed the ratio scale of measurement – see Table 3.2 below.

Table 2.2 Operationalization of Variables

Variables	Operational Definition	Type of Scale
Resource management	Practices and decisions that promote the effective and essential management of farms	
	Land and soil management	Nominal
	Input management	Nominal
	Water management	Nominal
	Human resource management	Nominal
	Financial management	Nominal
Risk management	Practices that help the farmer in minimizing, controlling or avoiding events, which may adversely affect the value chain	
	Risk identification	Nominal
	Risk mitigation	Nominal
Research and development	The activities carried out to add onto existing knowledge or discover new ways of work.	
	Training and extension services	Nominal
	Benchmarking	Nominal
	Innovation	Nominal
Sustainability	Sustainable agriculture provides maximum utility to all stakeholders without exhausting future resources.	
	Returns from French beans farming	Ratio

3.7 Data Collection

The study adopted both primary and secondary data collection methods. Questionnaires, interviews and observations aided in the collection of primary data. The questionnaires had both open ended and close-ended questions. Closed ended questions collected quantitative data while the former collected qualitative data. The questionnaire had three parts, which were in line with the objectives of the study.

Section A was about the characteristics of the respondents. It sought information on the geographic location, education and sources of income of the respondents. Section B was in line with the first objective of the study, which was reviewing French beans farming and production. It collected information on the extensiveness of French beans farming among individual farmers through information on the land tenure and history of French beans farming for individual respondents. Section C was in line with the second objective of establishing farm level management practices adopted in French beans farming. It collected data on resource management practices, risk management, and research and development practices. During the administration of questionnaires, the research also observed some of the farming practices. The respondents had ample time to provide information as the questionnaires were collected two weeks after the date of issuance. The research reviewed literature, journals, county magazines, reports and newspapers to obtain secondary data.

3.8 Reliability and Validity Tests

The research aimed at achieving content validity where the instruments of research covered adequately the research objectives. To ascertain this, an expert in the field of agri-business management assessed the research instruments. Further, the research ensured reliability by measuring the internal consistency of the research instrument. Cronbach (1951), designed a formula to help research tell whether the tests formulated would accurately measure the variables of interest. The recommended threshold for a reliable research instrument is an alpha value of 0.7 and above (Cronbach & Meehl, 1955).

3.9 Data Analysis

The study employed both qualitative and quantitative data analysis approaches. Descriptive statistics helped in analyzing information required for the first objective that sought to review French beans farming in Nyeri County. The second objective, which aimed at establishing the farm level management practices adopted in French beans farming, was also analyzed using descriptive analysis. The third objective, which sought to analyze the correlation between FMLP and sustainable French beans farming, employed linear regression analysis see Table 3.3 below.

Table 3.3 Data Analysis

Objectives	Data to be Collected	Questionnaire Items	Analyses
Review French beans farming and production	Qualitative data	Land tenure History of French beans farming Purpose of French beans farming Harvest and sales pattern over the last five years	Descriptive Analysis
Establish farm level management practices adopted in French beans farming	Qualitative data	Resource management Research and development Risk management	Descriptive analysis
Determine relationship between farm level management and sustainable French beans farming	Quantitative data	French beans farms yield and returns Sustainable agriculture	Linear regression analysis

Frequency distribution tables and percentages were the data presentation tools to ease interpretation. Additionally, presentation of qualitative data was in categories according to specific themes.

3.10 Ethical Considerations

To ensure ethical considerations, the research sought permission from the respondent by explaining the purpose of the study using local dialect. Further, the university provided a

letter of introduction, which was proof of identity. The research also ensured and assured respondents of discreteness of the information they gave. It also ensured that the respondents were comfortable with data collection timing.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

This chapter provides the data analysis, results and discussions from the study. These are in line with the objectives of the research. The chapter entails the response rates, demographic characteristics of respondents, and the results of all the three objectives of the study presented in the form of tables.

4.2 Response Rates

There was distribution of 265 questionnaires to the respondents. At the end of the two-week response period, respondents returned 243 questionnaires. Five respondents were absent from their farms and efforts to reach them to get back the questionnaires turned futile. Seventeen respondents refused to answer the questionnaires citing a lack of understanding of the questions. Indulging in explanation of the questions would interfere with the final answer of the respondent and consequently the objectivity of the research. Thus, the research considered these as unreturned questionnaires. The research then proceeded to sort out the questionnaires, ended up with 176 questionnaires with complete answers, and thus met the requirements for analysis. This is equivalent to a response rate of 66.4 percent. Baruch and Holton (2008), recommend a response rate of above 50 percent for social science research utilizing questionnaires. Thus, the response rate was in line with this and could therefore offer adequate information and analysis for conclusions and recommendations on this study.

4.3 Demographics of the Respondents

The questionnaire sought to gain information on the location of the respondents and their main source of income as part of their demographics. The research aimed at identifying the geographical locations of each of the respondents and therefore asked them to indicate their respective sub-counties in the questionnaire. Table 4.1 below illustrates the geographical distribution of the respondents. From the data it is evident that majority of the respondents, 29 percent, were from Kieni East while Mukurwe-Ini, Nyeri Central and Othaya had the least number of respondents representing 0.6 percent of the study population.

Table 3.1 Geographic Information of Respondents

Location	Frequency	Percent
Kieni East	51	29.0
Kieni West	49	27.8
Mathira East	45	25.6
Mathira West	26	14.8
Mukurwe-Ini	1	0.6
Nyeri Central	1	0.6
Othaya	1	0.6
Tetu	2	1.1
Total	176	100.0

The research sought to find out the main source of income of the respondents.

Table 4.2 Main Source of Income of the Respondents

Source of Income	Frequency	Percent
Mixed farming	48	27.3
Dairy farming	17	9.7
Crop farming	41	23.3
French beans farming	61	34.7
Employment	9	5.1
Total	176	100.0

From the data as illustrated in Table 4.2 above, majority of the respondents, 34.7 percent practiced French beans farming exclusively. 27.3 percent practiced mixed farming while

23.3 percent practiced crop farming exclusively meaning that they farmed French beans alongside other crops.

The level of education is a demographic characteristic that could potentially influence management capabilities of the respondents. The research therefore, asked the respondents to indicate their level of education. Majority of the respondents, 43.2 percent had attained primary level education. 35.2 percent had attained secondary level while 21.6 percent had gone up to the tertiary level as illustrated in Table 4.3 below.

Table 4.3 Level of Education

Level of Education	Frequency	Percent
Primary Level	76	43.2
Secondary Level	62	35.2
Tertiary Level	38	21.6
Total	176	100.0

4.4 French Beans Farming and Production per Acreage in Nyeri County

The first objective of the research was to review French beans farming and production per acreage in Nyeri County. This was to extract information on the extensiveness of this type of farming in the county. From the data, most French beans farms are small scale as 71 (40.3 percent) of the respondents had 0.125-1 ha of land under the crop.

Table 4.4 Acreage Under French Beans Farming

Number of Hectares	Frequency	Percent
0.125-1 ha	71	40.3
1.1-2 ha	53	30.1
2.1-3 ha	40	22.7
Above 3 ha	12	6.8
Total	176	100.0

There were 53 (30.1 percent) who had 1.1 to 2 ha, 40 (22.7 percent) with 2.1 to 3 ha and 12 (6.8 percent) with above 3 ha of their land under French beans farming as illustrated in Table 4.4 above.

The research sought to get information on the number of years that the respondents had practiced French beans farming. The respondents who had practiced French beans farming for less than one year were 55 (31.3 percent) of the population. Majority of the respondents, 65 (36.9 percent), had practiced French beans farming for 1 to 4 years while 56 (31.8 percent), had practiced the trade for more than 5 years as shown in Table 4.5 below.

Table 4.5 Years of Practice

Years of Practice	Frequency	Percent
Less than 1 year	55	31.3
1 to 4 years	65	36.9
More than 5 years	56	31.8
Total	176	100.0

Different farmers have different reasons for practicing French beans farming which could potentially influence the sustainability.

Table 4.6 Purpose of French Beans Farming

Purpose of French Beans Farming	Frequency	Percent
Subsistence use/ Family consumption	2	1.1
Commercial use	24	13.6
Subsistence and commercial use	150	85.2
Total	176	100.0

From the data in Table 4.6 above, most farmers, 150 (85.2 percent), had French beans for both subsistence and commercial use. There were 24 (13.6 percent) of farmers who practiced French beans farming solely for commercial purposes while 2 (1.1 percent) practiced the type of farming for family consumption.

The research sought to find out whether the respondents had any managerial experience. Further, the research aimed to find out whether these same respondents engaged farm managers to aid in French beans farming in the farms. Table 4.7 below illustrates the results. Majority of the respondents, 132 (75 percent), had no managerial experience while 44 (25 percent) reported that they had experience.

Table 4.7 Managerial Experience

Presence of Managerial Experience	Frequency	Percent
Yes	44	25.0
No	132	75.0
Total	176	100.0

On engagement of the services of farm managers, 141 respondents (80.1 percent), reported that they did not take on the practice while 35 respondents (19.9 percent) engage farm managers as illustrated in Table 4.8 below.

Table 4.8 Engagement of the Services of Farm Managers

Engagement of the Services of Farm Managers	Frequency	Percent
Yes	35	19.9
No	141	80.1
Total	176	100.0

The average returns of French beans putting into consideration the quantity and the sales levels of the harvest are the determinants of the farmers' returns signifying presence or absence of sustainable practice. There were 70 respondents (39.8 percent) who indicated that their average sales levels were below 25,000, 56 (31.8 percent), stated that their sales levels were 25,000-100,000, 26 (14.8 percent) had sales levels 100,001 to 175,000, 15 (8.5 percent) had 175,001 to 250,000 while only 9 (5.1 percent), had sales levels above 250,000 as illustrated by Table 4.9 below.

Table 4.9 Sales Levels

Average Sales (KShs)	Frequency	Percent
Below 25,000	70	39.8
25,001 to 100,000	56	31.8
100,001 to 175,000	26	14.8
175,001 to 250,000	15	8.5
Above 250,000	9	5.1
Total	176	100.0

Table 4.10 below presents the findings on the quantity of harvest. 78 respondents (44.3 percent), indicated that they harvested 0 to 1,000 Kg, 43 (24.4 percent) harvested 1,001 to 4,000 Kg, 10 (5.7 percent) harvested 4,001 to 7,000 Kg, 24 (13.6 percent) indicated that their harvests were 7,001 to 10,000 Kg while 21 (11.9 percent) indicated that their harvest was above 10,000 Kg.

Table 4.10 Quantity of Harvest

Quantity of Harvest (Kilograms)	Frequency	Percent
0 to 1000	78	44.3
1,001 to 4000	43	24.4
4,001 to 7,000	10	5.7
7,001 to 10,000	24	13.6
Above 10,000	21	11.9
Total	176	100.0

4.5 Farm Level Management Practices

The use of FLMP in Nyeri County was the second variable examined in the study. The FLMP employed in the county include financial management, land and water, human resource, risk management and research and development practices. These influence the daily operations of a farm. They are the starting point of successful and sustainable farm management. Finances are one of the major determinants of the success of a farm business. Thus, the research sought to investigate on matters concerning the financial decision

makers of the farm the credit situation and the utilization of business proceeds from the farm.

Out of the 176 respondents, 119 who represented 67.6 percent of the sample size stated that the farm owners were in charge of the financial decisions of the farm. Those that had family members as the people in charge of the financial decisions were 28 which was 15.9 percent of the population while 29 representing 16.5 percent stated that farm managers were in charge of the financial decisions as presented in Table 4.11 below.

Table 4.11 Financial Decisions

Financial Decisions	Frequency	Percent
Farm owner	119	67.6
Farm manager	29	16.5
Family member	28	15.9
Total	176	100.0

The research sought to find out the sources of capital for the French beans farmers when they ventured into the business. The results are presented in Table 4.12 below.

Table 4.12 Sources of Capital

Sources of Capital	Frequency	Percent
Loans	19	10.8
Personal savings	36	20.5
Loans and personal savings	121	68.8
Total	176	100.0

There were 121 farmers making up 68.8 percent of the respondents who indicated that they used a combination of loans and personal savings. There were 36 respondents (20.5 percent) who indicated that they used personal savings while 19 (10.8 percent) of the respondents indicated that they used loans.

The research sought information on the presence of credit plans and repayment schedules among the farmers and the results are presented in Tables 4.13 and 4.14 below. One hundred and fifty-six respondents stated that they acquired credit at one time or another for their French beans farms which was 88.6 percent of the sample population. Only 11.4 percent (20 respondents) indicated that they did not acquire credit for their businesses. Out of the 156 respondents, 126 who represented 71.6 percent of the study population did not have concrete repayment plans. Only 31 respondents who represented 17.6 percent of the population had such plans.

Table 4.13 Credit Plans

Credit Plans	Acquired Credit		Presence of Repayment Plan	
	Frequency	Percent	Frequency	Percent
Yes	156	88.6	31	17.6
No	20	11.4	126	71.6
Total	176	100.0	156	89.2
Missing	0	0	19	10.8
Total	176	100.0	176	100.0

The research also sought information on the alternative means of credit repayment in case the French beans farming venture did not meet the requirements and the results are discussed in Table 4.14.

Table 4.14 4Alternative Means to Meet Credit Repayment Needs

Credit Repayment Alternatives	Frequency	Percent
Taking other loans	73	41.5
Negotiating with the bank	3	1.7
Sale of assets	81	46.0
Total	157	89.2
Missing	19	10.8
Total	176	100.0

Out of the 156 respondents who said that they used credit for their business, 41.5 percent who were 73 respondents said that they utilized other loans to pay for the credit. There

were 81 respondents which was 38.1 percent stating that they use sale of assets as credit repayment alternative while 3 respondents (1.7 percent) would negotiate with the bank.

The utilization of business proceeds was among the factors that the research used to measure the sustainability of the French beans farms. Table 4.15 below presents the results. Ninety respondents who represented 51.1 percent of the study population stated that the proceeds go to household use. Thirteen respondents, 7.4 percent used the proceeds for re-investment into the business while another 37.5 percent (66 respondents) used the proceeds for loan repayment. Another 4 percent (7 respondents) stated that they divide their business proceeds for re-investment, household use and loan repayment.

Table 4.15 Utilization of Business Proceeds

Utilization of Business Proceeds	Frequency	Percent
Re-investment	13	6.8
Household use	90	51.1
Loan repayment	66	37.5
Re-investment, household use, loan repayment	7	4.0
Total	176	100.0

Water and land management are among the factors that the research used to measure the success and sustainability of a French beans farm and business. The research sought to get information on the main source of water that the French beans farmers in Nyeri County use. It also sought to find out whether these farmers would have any back-up plans in the case of failure of their main source of water.

Out of the 176 respondents, 112 which was representative of 63.6 percent of the sample population, depended on rainwater. Thirty-two respondents (18.2 percent) indicated that

they depended on municipal water. 17 of the respondents who comprised 9.7 percent of the study population depended on wells, 11 who were 6.3 percent depended on rivers while four representing 2.3 percent of the study population depended on lakes. The results are presented in Tables 4.16, 4.17 and 4.18 below.

Table 4.16 Main Source of Water

Main Source of Water	Frequency	Percent
Lakes	4	2.3
Rivers	11	6.3
Wells	17	9.7
Rainwater	112	63.6
Municipal water	32	18.2
Total	176	100.0

The research sought information on the respondents who had water source back-up plans and the results illustrated in Table 4.17 below. There were 148 respondents representing 84.1 percent of the study population who stated that they did not have a water back up plan. Twenty-eight respondents (15.9 percent), had a water source back-up plan.

Table 4.17 Water Source Back-up Plan

Availability of Water Source Back-up Plan	Frequency	Percent
No	148	84.1
Yes	28	15.9
Total	176	100.0

Table 4.18 below presents the findings on the longevity of the back-up plan for the respondents that stated they had one. Out of the 28 respondents who stated that they had a back-up plan, only 7 (4 percent) stated that the plan would last their farms for more than 3 months. There were 11 respondents (6.3 percent) who were sure that the plan would last the farms for 3 months while 9 (5.1 percent) indicated that the back-up plan would last them less than a month.

Table 4.18 5Water Source Back-up Plan Sustainability

Back-up Plan Sustainability	Frequency	Percent
Less than one month	9	5.1
3 months	11	6.3
More than 3 months	7	4.0
Total	27	15.3
Missing	149	84.7
Total	176	100.0

Table 4.19 below presents the findings on the frequency of engagement of land management experts. Out of the 176 respondents, 25 (14.2 percent) indicated that they engaged professional land experts on a monthly basis. Only 3 respondents (1.7) who engaged the land experts every 3 months. Those who engaged the professional land experts every 6 months were only 10 (5.7 percent) while 48 (27.3 percent) engaged the experts after more than 6 months. Majority of the respondents, 90 (51.1 percent) had never engaged the services of professional land experts.

Table 4.19 Frequency of Engagement of Professional Land Experts

Frequency of Engagement of Professional Land Experts	Frequency	Percent
Monthly	25	14.2
Every 3 months	3	1.7
Every 6 months	10	5.7
More than 6 months	48	27.3
Never	90	51.1
Total	176	100.0

Human resources are the backbone of any sustainable business including the French beans farm. The research sought information on the types of human resources that the respondents mostly engaged in their farms. The research sought information on the human resources that the farmers mostly engaged in their farms. The results are presented in Table 4.20 below.

Table 4.20 Human Resources engaged in the French Beans Farm

Human Resources Engaged in the Farm	Frequency	Percent
Soil and Power of Hydrogen (pH) experts	8	4.5
Farm manager	35	19.9
Grading experts	18	10.2
Farm hands	98	55.7
Farm supervisor	7	4.0
All the above	10	5.7
Total	176	100.0

Majority of the respondents, 98 (55.7 percent) indicated that they had farm hands. Eighteen respondents (10.2 percent) indicated that they hired grading experts while 35 respondents (19.9 percent) stated that they hired farm managers. The respondents who hired soil and pH experts were 8 representing 4.5 percent of the study population while those who used the services of farm supervisors were seven representing 4 percent of the study population. There were those respondents accustomed to hiring soil and pH experts, farm managers and supervisors, grading experts and farm hands who comprised 5.7 Percent (10 respondents) of the study population.

The research also sought information on the persons in charge of human resource decision making in the French beans farm. Majority of the respondents, 125 (71 percent), stated that the farm owners made these decisions. Twenty-four respondents- 13.6 percent stated that the farm managers made the decisions. Those who stated that the supervisors made decisions were 23 respondents representing 13.1 percent of the study population while only 2.3 percent-4 respondents stated that family members made these decisions as illustrated in Table 4.21 below.

Table 4.21 Human Resource Decision Making

Human Resource Decision Makers	Frequency	Percent
Farm owner	125	71.0
Farm manager	24	13.6
Farm supervisor	23	13.1
Family member	4	2.3
Total	176	100.0

The research wanted to get information on the terms by which the French bean farmers engaged the human resources. The results were presented in Table 4.22 below.

Table 4.22 Terms of Engaging Human Resources

Terms of Engaging the Human Resources	Frequency	Percent
Casual	143	81.3
Contract	14	8.0
Permanent	19	10.8
Total	176	100.0

There were 143 respondents who comprised 81.3 percent of the study population who engaged their human resources on casual basis, 14 of the study population (8 percent) engaged the human resources on contract basis while 19 (10.8) percent engaged their human resources on permanent basis.

Training was one of the factors that the research used to help in determining the human resource management practices at the French beans farms. The results were presented in Table 4.23 below and there were 106 respondents who represented 60.2 percent of the study population that stated they trained staff when need arises, 34 who were 19.3 percent train every 3 months, 5 representing 2.8 percent trained their staff every 6 months, 4 respondents who made up 2.3 percent of the sample population trained their staff once a year. Twenty-four respondents who made up 15.3 percent of the sample never trained their staff.

Table 4.23 Frequency of Staff Training

Frequency of Staff Training	Frequency	Percent
When need arises	106	60.2
Every 3 months	34	19.3
Every 6 months	5	2.8
Once a year	4	2.3
Never	27	15.3
Total	176	100.0

All businesses are prone to risk and the lack of an understanding of the risks that may befall certain businesses may threaten the profitability and consequently its sustainability. In light of this the research sought to get information on the presence of risk management policies in the French beans businesses. There were only 8 respondents representing 4.5 percent of the study population who stated that they had risk management plans and policies in place. The rest, 168 respondents who represented 95.5 percent of the population did not have any policies in place – see Table 4.24 below.

Table 4.24 Presence of Risk Management Policies

Presence of a Risk Management Policy	Frequency	Percent
Yes	8	4.5
No	168	95.5
Total	176	100.0

The research sought to find out the opinions of the respondents regarding the various types of risks that were likely to pose the greatest risk to their French beans farm business. The majority of the respondents, 110 representing 62.5 percent of the population stated that poor water management poses the greatest risk for the French beans farm. 16.5 percent- 29 respondents cited that pests and diseases were the greatest risk to the French beans farm, while 14 respondents representing 8 percent of the study population stated that poor land and human resource management was the greatest risk to the French beans business. Only

9 respondents who represented 5.1 percent of the study population thought that poor financial management posed a great risk to the French beans farming business as Table 4.25 below shows.

Table 4.25 Risks that May Befall French Beans Farms

Risks	Frequency	Percent
Pests and diseases	29	16.5
Poor water management	110	62.5
Poor land management practices	14	8.0
Poor human resource management	14	8.0
Poor financial management	9	5.1
Total	176	100.0

As shown in Table 4.26 below, the research sought to get information on the presence of insurance policies among the French beans farmers. There were 8 respondents representing 4.5 percent of the study population who stated that they had insurance policies while 168 respondents-95.5 percent did not have.

Table 4.26 Utilization of Insurance Policies

Presence of Insurance Policies	Frequency	Percent
Yes	8	4.5
No	168	95.5
Total	176	100.0

Research and development ensures continuous improvement of the French beans farm making sure that it is sustainable in the end. The research sought to get information on the adoption and practice of research and development activities within the French beans farm and the results are presented in Table 4.27 below. Eighty respondents, 45.5 percent indicated that they engage in research activities while 96 respondents representing 54.5 percent of the study population stated that they do not engage in research activities.

Table 4.27 Engagement in Research Practices

Engagement in Research Practices	Frequency	Percent
Yes	80	45.5
No	96	54.5
Total	176	100.0

Benchmarking practices are part of research and an effort to continuously learn and improve. The research found that 37.5 percent who were 66 respondents engaged in benchmarking practices while 110 respondents, 62.5 percent did not (Table 4.28 below).

Table 4.28 Engagement in Benchmarking Practices

Engagement in Benchmarking Practices	Frequency	Percent
Yes	66	37.5
No	110	62.5
Total	176	100.0

The presence of extension services ensures that the French beans farm and business has people who are more knowledgeable in the field guiding them. The research thus, sought to get information on the frequency of the availability of extension services to the French beans farmers to give insights on French beans farming as a business. The results are presented in Table 4.29 below.

Table 4.29 Frequency of Extension Services

Frequency of Extension Services	Frequency	Percent
Monthly	8	4.5
Every 3 months	7	4.0
Every 6 months	43	24.4
Never	118	67.0
Total	176	100.0

One hundred and eighteen respondents indicated that they had never received extension services representing 67 percent of the respondents. 24.4 percent who were 43 respondents indicated that they received these services every six months while seven respondents

representing 4 percent received the services every three months. Eight respondents- 4.5 percent of the study population stated that they received the services monthly.

The presence of innovative farming methods signifies a certain degree of the adoption of research activities in the farm. Thus, the research sought to get information on the adoption of innovative farming methods by the French beans farmers to make their businesses lucrative. There were 100 respondents-56.8 percent whose farms had the evidence of innovative farming methods while 76 of the respondents representing 43.2 percent of the study population did not have innovative farming methods evidence in their farms – see Table 4.30 below.

Table 4.30 Presence of Innovative Farming Methods

Presence of Innovative Farming Methods	Frequency	Percent
No	76	43.2
Yes	100	56.8
Total	176	100.0

4.6 Relationship Between Farm Level Management and Sustainable French Beans Farming

On determining the relationship between farm level management and sustainable farming, the research applied linear regression analysis. Predictors were land and water management; risk management; financial management; human resource management; and research and development, while dependent variable was sustainability. The model summary in Table 4.31 below indicates that land and water management; risk management; financial management; human resource management; and research and development explained 73.5 percent of the variation in sustainability of the French beans farms in Nyeri County – this is a high explanatory power.

An analysis of variance test was to determine the significance of the linear regression model and done at 0.05 level of significance. As illustrated in Table 4.31 below, the overall model was significant since p-value (0.000) was less than 0.05 level of significance. In addition, all independent variables including the constant were significant since the p-values were less than 0.05 level of significance, which meant that land and water management; risk management; financial management; human resource management; and research and development were good predictors of sustainability of the French beans farms in Nyeri County.

Table 4.31 Regression Analysis Results

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate		
1	.857 ^a	.735	.727	1.2375		
	Model	Sum of Squares	df	Mean Square	F-value	p-value
1	Regression	71.044	5	14.209	105.478	.000 ^b
	Residual	25.615	170	.151		
	Total	96.659	175			
		Unstandardized Coefficients		Standardized Coefficients		
		B	Standard Error	Beta	t-value	p-value
	(Constant)	4.460	2.700		7.556	.000
	Risk management	.210	.050	.390	4.167	.000
	Human resource management	.264	.084	.346	3.137	.000
	Research and development	.240	.058	.192	4.146	.002
	Land and water management	.326	.055	.753	5.962	.000
	Financial management	.364	.099	.458	3.669	.000

The estimated linear regression model then was $SUB = 4.460 + 0.210RMGT + 0.264HRM + 0.240RD + 0.326LWMGT + 0.364FMGT$, where SUB, RMGT, HRM, RD, LWMGT, and FMGT were sustainability of the French beans farm; risk management; human resource management; research and development; land and water management; and financial management, respectively. Moreover, the results indicated that the level of sustainability of the French beans farm would be 4.460 if all other factors were to be held

constant and risk management; human resource management; research and development; land and water management; and financial management would marginally increase, on the average, the sustainability of the French beans by 0.210, 0.264, 0.240, 0.326, and 0.364 in that order.

4.7 Discussion of Results

Sound farm business management depends on a variety of factors among them resource, risk management and research and development. Further success of management at the farm level requires a balance in these specific disciplines (Malcolm, 2004). The significant relationships of the independent variable and the dependent variables as illustrated in Table 4.33 depicted that an increase in proper management behaviors may lead to improved sustainability in the French beans farms in Nyeri County.

Blank and Klonsky (2011), indicate that financial management is one of the major factors that lead to economic sustainability of the farm. Majority of the French beans farmers in Nyeri County exhibited a deficiency when it came to practicing financially healthy farming. Majority of them indicated that they had acquired credit but did not have solid credit repayment plans. Therefore, they ended up making other wrong choices so that they could pay up the credit which has an adverse effect on the sustainability of the farm. Further, most of the farmers indicated that they would use the proceeds of the business for household purposes which means that they had little or nothing to plough back to the business which is detrimental to sustainability. Only those farmers who exhibited stringent

financial management procedures were more likely to have higher quantity of yields per acreage and subsequently higher sales levels.

The identification and evaluation of agricultural risks is the genesis of the selection of proper farm level management methods (Muhammad & Gazanfar, 2013). From the results, most of the farmers (168), which was 95.5 percent of the population did not have any risk management policies for their farms. However, they knew that the French beans farming business was quite risky and identified water management as the most likely risk to affect their business. This brings in the issue of water management as a driving factor in ensuring the sustainability of the farm.

Hans (2018), indicates that the lack of proper water management systems leads to increased agricultural weariness and general poverty of the farmer and the country. Over-dependence on rain fed agriculture was evident among the Nyeri County French bean farmers as there were 112 (63.6 percent) of the respondents who indicated that they depended on rain water for French beans farming. One hundred and forty-eight farmers (84.1 percent) did not have any back-up plans in case the rains fell. Out of those who had back-up plans, only 7 (4 percent) had a back-up plan that would last them for more than 3 months. This is a recipe for disaster especially with the changing rainfall patterns. The farmers were ill equipped to continue with their French beans farm in case rain failed which affected the sustainability of their French beans farms businesses.

Human resources are the backbone of sustainable businesses. It is imperative to hire the right fit for the French beans farm. Most of the farmers employed the services of farm hands and rarely used soil and pH experts, grading or even agricultural experts. The results of these were poor quantities and qualities of produce which were indicators of the lack of sustainability. Similarly, it would also be necessary to ensure that the staff receive training often to foster continuous development. Here, the aspect of research and development also comes in which is imperative to higher yields and sales levels. Most of the farmers, 106 (60.2 percent), indicated that they only carried out staff trainings on a needs basis. While most of the farmers indicated that they do bench marking in other counties that exhibit prowess in French bean farming, the sales levels did not reflect this. The explanation for this could be due to the lack of support from extension officers who would give professional advice. One hundred and eighteen farmers (67 percent) indicated that they had not received any extension services over their years in French beans farming.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study as per the objectives. The chapter also contains the conclusions made from the study and the recommendations that arise from the findings. It also provides areas for further research and the limitations of the study.

5.2 Summary

The study sought to investigate farm level management practices and their impact on sustainable French beans farming in Nyeri County. The study was guided by the presence or absence of farm level management practices such as financial, human resource, water, risk management and research and development. The study interviewed 265 respondents and ended up with 176 completed questionnaires from all the sub counties in Nyeri County. This was a response rate of 66.8 percent.

The first objective of the research was to review French beans farming and production per acreage in Nyeri County to determine the extensiveness and nature of the practice. The research findings indicated that majority of the French beans farmers in Nyeri County were small scale. There were 124 respondents which was equivalent to 70.4 percent who indicated that the area under French bean farming was below 2 ha. Sixty-five respondents stated that they had practiced French beans farming for 1 to 4 years meaning that it was not a venture that had been around the county for a long time. Additionally, majority of the respondents (150 or 85.2 percent) utilized the proceeds for both subsistence and commercial use. The French beans farmers were also short of managerial experience. One

hundred and 32 respondents (75 percent) indicated that they did not have any prior managerial experience. Similarly, another 141 making up 80.1 percent of the respondents reported never having engaged the services of farm managers. A considerable number of respondents, 70 equivalent to 39.8 percent of the sample size also indicated that their proceeds from the business were less than KShs 25,000. The harvest was also low as 78 farmers equivalent to 44.3 percent indicated that their harvest per season was less than 1,000 Kg.

The second objective was to establish the FLMP adopted in the French beans farms. The research used descriptive statistics to analyze the findings related to this objective. The farmers in Nyeri County had financial, human resource, water, risk management, research, and development as part of the FLMP. The research showed that most farmers had resource related practices in place that could lead to success of the French beans farm business. However, there was the lack of proper coordination of the resources which affected sustainability. Improper co-ordination means that there were imminent gaps when it came to decision making and the farm business planning cycle. From the findings, it was also clear that majority of the farmers were aware of risk management and research and development practices. The problem came in when there was supposed to be implementation of the same. The lack of proper implementation led to an adverse effect to sustainability.

The third objective was to determine the relationship between farm level management practices and sustainable French beans farming in Nyeri County. The research used

regression analysis for this objective. Undoubtedly, FLMP is an important aspect when it comes to the sustainability of the French beans farm. Farms that utilized proper financial and water management practices reported higher returns in terms of quantity and sales levels than those that did not. The other factors- human resource, water and land management had slightly lower significance but were equally important. The farms that managed these resources well also reported higher productivity which is the ultimate road to sustainable practice.

5.3 Conclusion

The study concludes that FLMP are important factors when it comes to ensuring the sustainability of the French beans farm. The lack of proper implementation of these practices has led to the shrinkage of the potential of these lucrative venture in the county. The French beans productivity in Nyeri County per acreage is below the expected rate. Majority of the farmers have below 2 ha of land and get a produce of below 1,000 kg which is half of what such a piece of land should produce. The over dependence on rain fed agriculture coupled up with the scarcity of back-up water sources may be one of the causative factors of such low productivity.

The study also concludes that the lack of proper guidance on matters finances may lead to the poor utilization of business proceeds which is detrimental to sustainability. Most of the farms that have the farm owner making the financial decisions are likely to use the proceeds from the venture in household uses. The farms that have farm managers will on the other hand re-inject and re-invest the profits to the business ensuring sustainability. The adverse

effects of the lack of guidance is also evident in all other elements of resource management mentioned in the study. For instance, in human resource management, the farms that do not engage the services of farm managers are less likely to have staff trainings as a routine which is adversarial for sustainability. The same farms are also less likely to have effective and efficient water management policies. Additionally, the lack of extension services threatens the sustainability of the French bean farm. Extension services act as an intermediary between research and the farmer. They help farmers in decision making and knowledge implementation. Consequently, when most farmers indicate that they have never had the same, then it means that there is a gap. Therefore, implementation of FLMP would go a long way in improving the sustainability of French bean farming in Nyeri County.

5.4 Recommendations

The first recommendation is to have collaboration between agricultural extension officers and French bean farmers in the county. The agricultural extension officers have plenty of information regarding means by which farmers can make French beans farming more lucrative and sustainable. The county government of Nyeri should see to it that agricultural extension officers fulfil their duties by going to the farmer rather than just operating from the offices. The movement of extension officers to the farms should be mandatory. Further, there should be specific extension officers to deal with horticultural produce in the county. This will be the genesis of great collaborations fastening the shift from agriculture to agribusiness.

There is also a recommendation for the County government of Nyeri with the aid of the Ministry of Agriculture to put up a department of water harvesting and management. This department would sensitize the farmers on modern means through which they can harvest water and store it for future Agricultural uses. These methods would be large-scale such as the use of water pans. The department will also sensitize farmers on alternative water sources for farming instead of the over dependence on rain-fed agriculture that is currently evident among the French bean farmers. Still on this, the county government should collaborate with local television and radio stations to pass on information regarding sustainable French bean farming. Information is power and this would contribute to the promotion of sustainable French bean farms.

Lastly, the recommendation would be to promote partnerships between financial institutions and the farmers. These financial institutions would be useful when it comes to training the farmers on financial management practices. Figures of authority do not have to be the ones initiating these partnerships. Instead, farmers themselves after recognition of the problem can organize and approach a financial institution for the same. In this era of corporate social responsibility, most of the institutions would take on this responsibility. This would eventually translate to sustainability of the French bean farm through better financial management practices.

5.5 Areas for Further Research

Other researches should take on a similar study in Nyeri County and other counties where farmers practice French beans farming. There should also be a comparative study on FLMP

and sustainable French bean farming between Nyeri County and Kirinyaga County. This would be to find the existing gaps in the practices of the French beans farmers of the two counties. The other suggestion is that there are studies separating each of the FLMP to evaluate their effects on sustainability of the French bean farm. For instance, water management for sustainable French beans farming.

5.6 Limitations of the Study

This research was on French beans farms in Kenya. Further, the research only focused on Nyeri County while there are other counties practicing French bean farming and looking forward to sustainable practice. Therefore, the generalization of these results should exercise caution. The other limitation of the research was the weather. The study was planned for September- mid November which is a period for short rains. Therefore, this was a limiting factor when it came to ease of movement to collect data in the farms. There was also the lack of guarantee that the respondents would answer to all questions comprehensively. This limiting factor was evident when some of the respondents cited a lack of understanding as the reason why they could not complete the questionnaire.

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APPENDICES

Appendix 1 Letter of Introduction

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH DATA FOR MASTER OF BUSINESS ADMINISTRATION

I am a postgraduate student in the school of business at University of Nairobi pursuing a Master of Business Administration. As part of the fulfilment for the award of this degree, I am carrying out a research on “Farm Level Management Practices for Sustainable French Beans Farming in Nyeri County”. I therefore humbly request for information regarding farm level management practices carried out in your farm.

The information that you will provide will be solely for academic purposes. I would also appreciate any additional information, suggestions and comments that you would deem necessary to better my research.

Thank you in advance.

Sincerely,

Rebecca Ndirangu

MBA Student

University of Nairobi

Appendix II Questionnaire

This questionnaire targets French beans farmers, both large and small scale in Nyeri County. The purpose of this questionnaire is to collect data for the study “Farm Level Management Practices for Sustainable French beans farming in Nyeri County.” Please tick in the appropriate boxes and fill the blank spaces where necessary. If the answer does not fit the provided space, use the blank space at the back of the questionnaire. Your participation, honesty and objectivity are highly appreciated.

Section A Characteristics of Respondents

1. Geographic information

Sub-county

2. What is your level of education?

Primary level [] Secondary level [] Tertiary level []

3. What is your main source of income?

Mixed farming [] Dairy farming [] Crop farming []

French beans farming [] Employment []

Section C Financial Management Practices in Nyeri County

Financial Management Practices

10. Who oversees financial decisions at the farm?

Farm owner []

Family member []

Farm manager []

11. How did you acquire the capital to begin the French beans farming venture?

Loans []

Personal savings []

Loans and personal savings []

12. Have you acquired any credit for the business so far?

Yes []

No []

13. If yes, do you have any specific credit repayment plans?

Yes []

No []

14. How does the farmer ensure that there are timely payments to the credit facilities?

Taking other loans []

Negotiating with the bank []

Sale of assets []

15. How are the proceeds from the business utilized?

Re-invested into the business []

Household use []

Loan repayment []

Re-invested into the business, Household
use, loan repayment []

Land and Water Management

16. What is the main source of water for your farm?

Lakes []

Rivers []

Wells []

Rainwater []

Municipal water []

17. In case of failure of the source of water, does your farm have a back-up plan?

Yes []

No []

18. For how long would the plan mentioned above sustain the farm in case of extended failure of the main source of water?

Less than one month [] 3 months []

More than 3 months []

19. How often do you engage the services of a professional land management expert?

Monthly []

Every 3 months []

Every 6 months []

More than 6 months []

Human Resource Management

20. Which of the following human resources do you engage in your farm? (Tick all appropriate answers)

Soil and pH experts []

Farm manager []

Grading experts []

Farm hands []

Farm supervisor []

All the above []

21. Who oversees human resource management decision making? (recruitment, staffing, motivation, discipline)

Farm owner []

Family member []

Farm manager []

Farm supervisor []

22. On what terms do you engage most of the above-named human resources in your farm?

Casual []

Contract []

Permanent []

23. How often do staff trainings take place?

When need arises []

Every 3 months []

Every 6 months []

Once per year []

Never []

Risk Management

24. Is there a risk management policy in your farm?

Yes []

No []

25. Do you have any insurance policies to safeguard your French beans farm against risk?

Yes []

No []

26. Which of the following risks are likely to have the greatest impact once they befall your French beans farm?

Pests and diseases []

Poor water management []

Poor land management practices []

Poor human resource management []

Poor financial management practices []

Research and Development

27. Do you engage in research activities in your farm?

Yes []

No []

28. Have you ever engaged in bench marking practices?

Yes []

No []

29. How often do agricultural extension service providers engage you to give more insights on French beans farming as a business?

Monthly []

Every 3 months []

Every 6 months []

More than 6 months []

Never []

30. Are there any innovative farming methods that your farm has adopted?

Yes []

No []

Thank you