

**QUALITY MANAGEMENT SYSTEMS AND COFFEE QUALITY IN SMALL SCALE
COFFEE SUB-SECTOR IN KENYA**

BY;

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DECLARATION

This research project is my original work and it has not been presented in any other university or institution for academic credit.

Signed by:

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

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DEDICATION

I dedicate this project to my husband Gabriel and daughter Quenta.

ACKNOWLEDGEMENT

First I want to thank God Almighty for giving me strength and good health throughout the study period.

Secondly I would like to appreciate my supervisor, Mrs Zipporah Kiruthu for her patience, suggestions and guidance throughout the research project.

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ABSTRACT

Quality management systems are developed for use as a management technique to communicate to employees what is required to produce desired quality of products and services and to influence employees' actions to complete tasks according to the quality specifications. The Kenyan coffee competes on global market on its unique quality. The sector therefore is always under pressure to produce coffee that will attract a premium price. This research study focused on the small scale coffee subsector as it accounts for more than a half of the total coffee production in Kenya. Well managed quality management systems have the potential of transforming operational performance of an organization. The objectives of the study were to establish the quality management systems in use by the cooperative societies in the small scale coffee subsector, to determine extent of quality Management systems adoption by the cooperative societies in the small scale coffee subsector and to establish the impact of adopted quality management systems on coffee quality. The study was carried out through a descriptive study of 20 coffee cooperative societies in Nyeri County. Questionnaires were used to collect primary data. The collected data was analysed using descriptive statistics while regression analysis technique was used to establish the relationship between the dependent and independent variables. The research findings were presented in figures and tables. The findings indicated that the small scale subsector is majorly using internal quality management systems and ISO9001:2008 quality management system. However, the extent of adoption of the quality management systems is very minimal. Further, the findings indicated a strong relationship between the extent of adoption of the quality management system, various quality management systems and coffee quality. The main conclusion was that there is no commitment by the cooperatives to using QMS in achieving coffee quality. The researcher recommends that more sensitization on the potential impact of QMS on coffee quality should be done in the subsector.

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ABBREVIATIONS AND ACRONYMS

QMS	Quality Management System
QM	Quality Management
ISO	International Organization for Standardization
CBK	Coffee Board Of Kenya
GMP	Good Manufacturing Practices
GAP	Good Agricultural Practices
IISD	International Institute for Sustainable Development
MAFAP	Monitoring African Food and Agricultural Policies
FAO	Food and Agriculture Organization

CHAPTER ONE: INTRODUCTION

Background of the study

Quality has developed into the most competitive weapon, and many organizations have realized that Total Quality Management is the new way of managing for the future. Quality is a competitive advantage but it does not just happen, it has to be managed. It is also an underlying factor for many other sources of competitive advantage. Successful ventures offer consistent quality, so an important consideration for any venture is how quality is going to be perceived and measured. In some cases quality may be related to value-added strategies, such as obtaining third party certification; in other cases, quality may be related to the fact that the product being offered is of a higher physical quality than the competitor's product, or from providing excellent customer service (Cole, 2008).

Quality management systems are therefore developed for use as a management technique to communicate to employees what is required to produce desired quality of products and services and to influence employees' actions to complete tasks according to the quality specifications (Reichheld, Fredrick, and Earl, 1990). A fully documented QMS will ensure that the customers' requirements are met and customers have confidence in the ability of the organization to deliver the desired product and service consistently meeting their needs and expectations; and that both internal and external organization's requirements are met and at an optimum cost with efficient use of the available resources i.e. materials, human, technology and information. These requirements can only be truly met if objective evidence is provided, in the form of information

and data, to support the system activities, from the ultimate supplier to the ultimate customer (dti.gov.uk, accessed on 8th august 2015).

In spite of the fact that Kenya controls a very small and declining share of global coffee exports, there is a market opportunity for Kenya to pursue a differentiation strategy on quality, given the country's natural endowments that make Kenyan coffee to be sought after as specialty coffee for its unique quality (Condliffe, Kibuche, love& Ruparell, 2008). Coffee producing areas contain about 45 per cent of Kenya's population, estimated at 36.4 million. Since some of these people are as much as 40 per cent income-dependent on coffee, their lives revolve around the fate of coffee (Mureithi, 2008).

1.1.1 Quality management systems

A management system describes the set of procedures an organization needs to follow in order to meet its objectives. A quality management System is a system that has been developed in order to maintain the desired quality and specifications that have been determined necessary for a product and also works towards maximizing efficiency in order to get the quality. (Online law dictionary). A good and effective QMS will: Set direction and meet customers' expectations, Improve process control, Reduce wastage, Lower costs, Increase market share, Facilitate training, Involve staff, and Raise morale. Organizations with such a QMS will therefore enjoy its benefits which include: more efficient use of resources, improved risk management, and Increased customer satisfaction as services and products consistently deliver what they promise (dti.gov.uk, accessed on 8th august 2015).

An effective QMS must also be a strategic tool designed to deliver business objectives, and must have, at its core, a process approach, with each process transforming one or more inputs to create an output of value to the customer. The understanding of the many interrelationships between these processes demands that a systems approach to management is adopted. The processes must be thoroughly understood and managed so that the most efficient use is made of available resources, to ensure that the needs of all the stakeholders are met (ISO website, accessed on 5th August 2015). A quality management system can be 'home grown,' meaning that an organization defines and documents all the necessary components of a quality management system without basing it on any model or framework. In fact, while most organizations do rely on one of many quality management models, the most successful companies are those that adapt the model and make it uniquely theirs (Douglas, study.com).

Various management systems and standards have been developed. These include the International Organization for Standardization (ISO 9000), Good manufacturing practices, Good agricultural practices (Global GAP), Food Safety Management System, the US Federal Sentencing Guidelines, Occupational Safety and Health Administration (OSHA) and environmental management standards. These standards are generic in that they can be used regardless of the size and scope of an organisation and the market in which it primarily operates (chattered quality institute). The management system standards provide a model to follow when setting up and operating a management system. This study however focuses on those management systems which impact on the quality of the coffee as opposed to those that focuses on delivering a socially perceived value.

1.1.2 Coffee Quality

The single factor affecting a business competitive ability is the quality of its products and services, relative to those of competitors (Meredith, 1992). According to Meredith, quality products or services lead to more customer satisfaction; enhances the reputation of the firm; protects the firm from competition; minimizes health and safety liabilities and risk; improves worker moral; reduces scrap and waste; smoothens work flow; improves control and reduces a variety of costs. The word “quality” denotes a level of kind or character. In the case of coffee, the simplest classification of coffee quality is between “specialty” (coffee purchased primarily for its flavour with less regard for price) and “commercial” (coffee purchased primarily for its price and availability with less regard for flavour). These products appeal to different groups of individuals (segments) and many levels lie between the two extremes. Profitable coffee sales depend upon meeting the needs of the targeted customer segment. Coffee analysts categorizes roasted coffee products into 5 classifications (from highest to lowest): Super–specialty, specialty, usual-good-quality, average quality, and commercial quality. However, the final quality of flavour of the coffee consists of the nature of the green bean used, the roasting conditions, and freshness of the coffee (coffeeanalysts.com, accessed on 5th Oct. 2015).

Kenya has enjoyed the reputation of being one of the best producers of Arabica coffee in the world and still owns a certain reputation, but the choice to introduce Ruiru 11, a hybrid, to replace local Arabica cultivars negatively affected coffee quality, to the point that roasters having quality as the first criteria for selecting their coffee supplies have stopped sourcing from Kenya (Monique 2013). This decline in quality of the Kenyan Coffee is also associated with other factors like: On-farm care has gone down due to low and slow payments that hinder their cash

flow, high costs of inputs, use of fertilizers and control of coffee berry disease has declined reducing quality levels; Soil quality: Poor soil quality due to lack of organic manures to improve acidity and lack of extension services to help improve farm husbandry; Harvesting Methods: At times members harvest coffee berries both ripe and unripe lowering the quality of coffee instead of selective picking; and Pulping and fermentation methods: Large scale producers at times use bulky processing methods which lower output quality (Chege, 2012). The drop in the quality of Kenyan coffee has made it harder for Kenya to demand a premium over commodity prices. Approximately 20% of Kenya's coffee production was premium grade in 1993; this proportion fell to about 10% by 2003 and the trend persists (Condliffe et al, 2008).

Price Peterson (2013) argues that, if farmers opt for quality, they should choose the tangible or the intangible, either taste or a perceived benefit to the earth and society. He notes that, the advantage of producing coffee with excellent taste is that it can be universally and permanently recognized by the educated consumer who values his palate. But high-quality coffee, will probably also be more costly to produce. He further argues that, farmers who opt for intangible quality usually do so because they must. Issues of climate, the varieties available for cultivation in a given area, or culture preclude the achievement of good taste. In such cases, farmers need to invest in a socially perceived value such as organic, green, bird-friendly, or certification, for example by Fair Trade, UTZ and rainforest Alliance that satisfies some buyers' need to feel that their coffee delivers moral benefits. These values are neither universal nor permanent, but they may allow producers to survive for a period. It is therefore necessary to invest in tangible quality which is the focus of this study.

1.1.3 Kenyan Coffee Sector

Coffee is the third most important agricultural commodity to the Kenyan economy after horticulture and tea in terms of contribution to Gross Domestic Product (GDP) and employment creation in the agricultural sector. The enterprise contributes about 10 percent of the total agricultural export earnings, and up to 30 percent of the total labor force employed in agriculture. It employs about 250,000 people directly and an estimated 6 million people indirectly (Karanja 2002).

Small-scale production dominates the Kenyan coffee sector. Kenya has a dual coffee production system with about 3,300 large-scale coffee estates and over 600,000 smallholder producers organized into about 550 cooperatives. Smallholders (i.e. any farmer with less than five acres of land under coffee production) account for 75% of the land planted to coffee but only slightly over half of production (MAFAP, 2013). This together with the large fixed costs involved in the processing and marketing of coffee, along with the additional hindrance of inadequate transportation, communication, and banking infrastructure poses significant challenges to smallholder profitability. For this reason, the smallholder coffee sector has traditionally been organized into cooperatives in order to facilitate regulation and to improve the effectiveness and efficiency of smallholder coffee production, marketing and the provision of key inputs such as fertilizers, pesticides, credit and extension services (Mude, 2006).

Historically, the first government after independency created a centralized and capitalistic management of coffee in Kenya under the supervision of the Coffee Board of Kenya (CBK). Later on, Kenya was encouraged by the World Bank to liberalize the sector through the Structural Adjustments Programmes (SAP). The idea was to increase free competition. As a

consequence, the government removed its regulation and support mechanism to the coffee sector, thus causing direct and harder exposure of producers to stronger competition on the globalized market. The coffee crisis (2004) caused some farmers to replace their coffee plantations with other crops; this had heavy consequences on the quality and quantity of the Kenyan coffee production. The Kenyan coffee industry is still recovering from this crisis which asks for the rehabilitation of the growing zones and the improvement of both quantity and quality of coffee produced (Bagal, 2013).

Drop of quality combined with the high prices of Kenyan coffee contributed to the decrease of exports, too. Kenya's coffee exports have experienced a significant decrease from 62,000 tons in 2001 to 43,000 tons in 2010 (Bagal, 2013). Daviron & Ponte, (2005), argued that the global coffee market is currently plagued by two paradoxes: a coffee boom in consuming countries, and a coffee crisis in producing countries, characterized by oversupply of low quality coffee and shortage of high quality coffee. Therefore, the challenges of the coffee sector in Kenya are twofold: to improve quality on the international markets and to secure supplies in order to satisfy the demand in coffee and fully benefit from their product from an economical point of view.

1.2 Problem statement

A number of research studies have analysed the influence of a quality management system (mainly ISO 9001) on operational performance. Among this are: Terlaak and King (2000) who established that, the implementation of practices such as ISO 9000 can raise organizational performance and result in real competitive advantage; Thuo (2013) in his research paper titled 'adoption of ISO 9001 quality management standard and operational performance of service organizations in Kenya' who established that the implementation of ISO 9001 is beneficial in

terms of improving the operational performance; and Cua (2001) and Kaynak (2003), who found out that there is underlined importance and causal relationship between quality management practices and competitive advantage. These studies suggested positive relationship between quality management system and practices and organizational performance. However, none of these studies has focused on the coffee industry.

Research institutions and researchers in small scale coffee subsector have focused on sustainability of the subsector with their research geared towards this. Such studies include among others: A study by Kirumba & Pinard (2010), on Determinants of farmers' compliance with coffee eco-certification standards in Mt. Kenya region which revealed that there is a growing concern that certification projects focus on 'progressive' farmers rather than seek to uplift and integrate 'weak' farmers. Stefano (2005) in his study; *Deregulation, Quality and the Re-organization of coffee marketing in East Africa* established that preserving quality and reputation is more difficult, if not impossible, in deregulated market. Although these studies among others are concerned with the performance and to some extent the quality aspect of the subsector, they give no information as to which quality management systems have been adopted, the extent to which the small scale coffee subsector has adopted quality management practices and systems to achieve quality of coffee as their competitive advantage. This research therefore seeks to bridge the knowledge gap by analysing the quality management systems in use, extent of implementation and their influence on the quality of coffee in the small scale coffee subsector particularly at the cooperative level.

1.3 Research objectives

The main objective of this study is to establish the quality management systems in operation and their influence on coffee quality in small scale coffee sub-sector in Kenya. This will be achieved through the following specific objectives:

- i. To establish the quality management systems in use by the cooperative societies in the small scale coffee subsector
- ii. To determine extent of quality Management systems adoption by the cooperative societies in the small scale coffee subsector
- iii. To establish the impact of adopted quality management systems on coffee quality

1.4 value of the study

This study will bridge the knowledge gap on quality management systems being implemented by the cooperative societies in the small scale coffee sub sector and their influence on coffee quality. As Kenya takes pride in its coffee being used to blend low quality coffees from other origins, this study will establish if or not this is by chance or as a result of quality management efforts. The government therefore through the CBK can use the research findings accordingly in its effort to make the subsector more profitable. The research will add to the body of knowledge available in this area of study and the sub-sector. It also adds to the database of academic references in addition to forming the basis upon which further research can be carried out.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter discusses relevant literature on the topic of study and in line with the research objectives. It reviews the available relevant literature on quality, quality management and management systems and relevant quality management standards as well as literature on the coffee industry with emphasis to small scale coffee subsector in Kenya.

2.2 Systems Theory

Systems theory can reasonably be considered a specialization of systems thinking or as the goal output of systems science and systems engineering, with an emphasis on generality; useful across a broad range of systems (Wikipedia, accessed on 6th Oct. 2015). Deming (1993) and Senge (1990) have written about the importance of *systems thinking* in understanding workflow, business processes, and the impact of feedback. In any system, events will occur that have an effect elsewhere in the system, and possibly on the event itself. In order to have a full understanding of the effects of what is being done, it is necessary to understand the whole process and how it fits into the organizational system (O'Neill & Sohal 1999). Applying the principle of system approach to management typically leads to; Structuring a system to achieve the organization's objectives in the most effective and efficient way, understanding the interdependencies between the processes of the system, Structured approaches that harmonize and integrate processes, providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers, understanding organizational capabilities and establishing resource constraints prior to action,

targeting and defining how specific activities within a system should operate and Continually improving the system through measurement and evaluation.(www.iso.org,accessed on 15th august 2015).

Process management

A process is the transformation of a set of inputs, which can include actions, methods and operations into desired outputs (Oakland, 1989). There are two distinctly different movements of process management namely; process management for single process improvement and process management for system management. Process management for a single process improvement can be described as a structured systematic approach to analyse and continually improve the process, (Zairi, 1997). On the other hand, process management for system management is described by Pritchard and Armistead (1999, p. 22) as a more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness. Lee and Dale (1998, p. 218) summarizes the Business Process Management as both a set of tools and techniques for improving processes and a method for integrating the whole organization and it needs to be understood by all employees.

The methodology corresponding to process management for single process improvement can be summarized as: Process selection, Process description and mapping, Organizing for quality, Process measurements and quantifications and finally Process improvements (Pritchard and Armistead, 1999), while that of process management for system management is described by four strategic decision-making areas that form, what the authors call, a process management system namely; Process architecture, Process visibility, Monitoring mechanisms and Improvement mechanism(Biazzo and Bernardi 2003).

According to the ISO 9001:2008 international standard, the application of a system of processes within an organization, together with the identification and interactions of these processes, and their management to produce the desired outcome, can be referred as 'process approach'. It provides on going control over the linkage between the individual processes within the system of processes, as well as over their combination and interaction. When used within a quality management system, such an approach emphasizes the importance of: Understanding and meeting requirements, the need to consider processes in terms of added value, obtaining results of process performance and effectiveness, continual improvement of processes based on objective measurement.

2.3 Quality

Quality is the key to commercial success and economic development, and further down the line national and the international prosperity hence a great many people have spent many years attempting to solve the quality puzzle. However, quality is an unusually slippery concept; many people may have problem defining quality but they recognize it when they see it in goods without defects and services without mistakes (Kettunen, 2008). Different scholars have given different definitions for quality. Key among them includes the American W. Edward Deming who defined quality as a predictable degree of uniformity and dependability at low cost and suited to the market (Deming, 1986). Juran defines quality as "fitness for use" meaning quality is when a service or a product satisfies the intended use. Feigenbaum (1983) defines it as "The total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectations by the consumer". Tuchman (1980) also argued that quality means investment of the best skill and

effort possible to produce the finest and most admirable results possible. You do it well or you do it half-well. Quality is achieving or reaching for the highest standard as against being satisfied with the sloppy or fraudulent. It does not allow compromise with the second-rate.

In the past Quality was thought to mean a focus on "doing the repeatable things well (Miller & Pearce, 1987/8). It suggested predictability and reliability and was applied almost exclusively to the manufacturing environment. Further, it emphasized only incremental improvements, building on what was already in place -improving repeatability, refining and perfecting the existing process. Although most operations management scholars continue to focus on a conformance-to-specifications definition of quality, the meeting-and/or-exceeding expectations definition of quality is now widely accepted.

Quality institutions have also made significant contribution to the quality literature in the recent past. The American Society for Quality argues that 'quality' can be defined based on; customer's perceptions of a product/service's design and how well the design matches the original specifications, the ability of a product/service to satisfy stated or implied needs and also conformance to established requirements within an organization. Quality is the degree to which a set of inherent characteristics of a product meets requirements, ISO 9001 standard (2008). Organizations whose value creation processes meet and/or exceed their desired level of quality consistently and efficiently improve their profitability, gain more customer loyalty and their competitiveness in the market improves.

Further, Customers, products, employee satisfaction and organizational focus have been cited as the drivers of quality (business excellence website). In a customer-driven organization, quality is established with a focus on satisfying or exceeding the requirements, expectations, needs, and

preferences of customers; Conformance to requirements and zero defect concepts have roots in producing a product that meets stated or documented requirements. In most cases, product/service requirements originate from customer requirements, thereby creating a common link between product-driven quality and customer-driven quality, but the focus of the culture is on the quality of the product/service in a product-driven organization. If the customer requirements is accurately stated and designed into the production/service delivery process, then as long as the product/service meets the requirements, the customer should be satisfied. This approach is common in supporting the ISO 9001-based quality management system. The concept of employee satisfaction is that an organization takes care of employee's needs so that they can be free to worry only about the customer; the employee satisfaction is therefore a primary measure of success for an employee satisfaction quality driven organization. However, some organizations tend to focus on total organizational quality while others are quite successful at using a segmented approach to implementing quality.

The chartered quality institute argues that, managing organization quality calls for; the development and implementation of an effective system of *governance* by ensuring “management intent” is clearly defined through policies and processes; and ensuring it is fit-for-purpose with respect to the many stakeholder requirements (reflected in legislation, required external standards, shareholder/trustee requirements, customer and supplier requirements, employee requirements etc.), a commitment to *assurance*, both of how work is being carried out (i.e. process assurance) and the outputs being generated (i.e. product/service/project assurance) and embedding a culture of continuous evaluation and *improvement* through the use of qualitative and quantitative measures, root cause analysis and adoption of effective improvement techniques.

2.4 Quality management

Quality management emerged as an outcome of management field evolution which led to a paradigm shift in management of organizational performance from waste minimization and adherence to specifications to appreciation of value creation activities as interrelated processes which can be measured and improved, (Okwiri, 2004). To many people, quality management is ISO 9001 certification; to others, it is simply Quality Management. Others see it in terms of context-based management frameworks – sometimes referred to as Self-assessment models, Business Excellence models, or simply, Excellence models. Notwithstanding these differences in perception, interest in Total Quality Management or simply, Quality Management has now found its way into every sector serving the society in one way or the other (Okwiri, 2014).

Deming, (1986) defines quality management (also called total quality management) as a method for ensuring that all the activities necessary to design, develop and implement a product or service are effective and efficient with respect to the system and its performance. QM is not specific to managing people, but is related to improving the quality of goods and services that are produced in order to satisfy customer demands. It is “an approach to improving the competitiveness, effectiveness and flexibility of a whole organization and is essentially a way of planning, organizing and understanding each activity, and depends on each individual at each level” (Oakland, 1993). It involves placing the customer as the focal point of operations with an aim to continuously improve process performance in order to satisfy customer requirements (Bernes, 1992). It also involves the bottom-down communication and deployment of objectives, and the bottom-up implementation of continuous improvement activities.

At the center of TQM is the concept of the management of processes, and the existence of internal suppliers and customers within organizations. Organizations which have adopted TQM are likely to have developed an understanding of the processes which are operated, and attempt to make the customer the target of improvement activities (Oakland, 1993). A number of research studies have been carried out to examine the implementation process of TQM and investigate the critical success features for implementing TQM. A common conclusion of these studies is that the way TQM is implemented is central to its long term success within an organization (Globadian and Gallear 2001). TQM emphasizes: Top management commitment, Focus on customer satisfaction, Product design and manufacturing for quality, Continuous improvement, Extensive education and training of employees, Employees involvement and empowerment and Development and maintenance of an effective in house quality assurance system, as well as an effective suppliers quality management system.

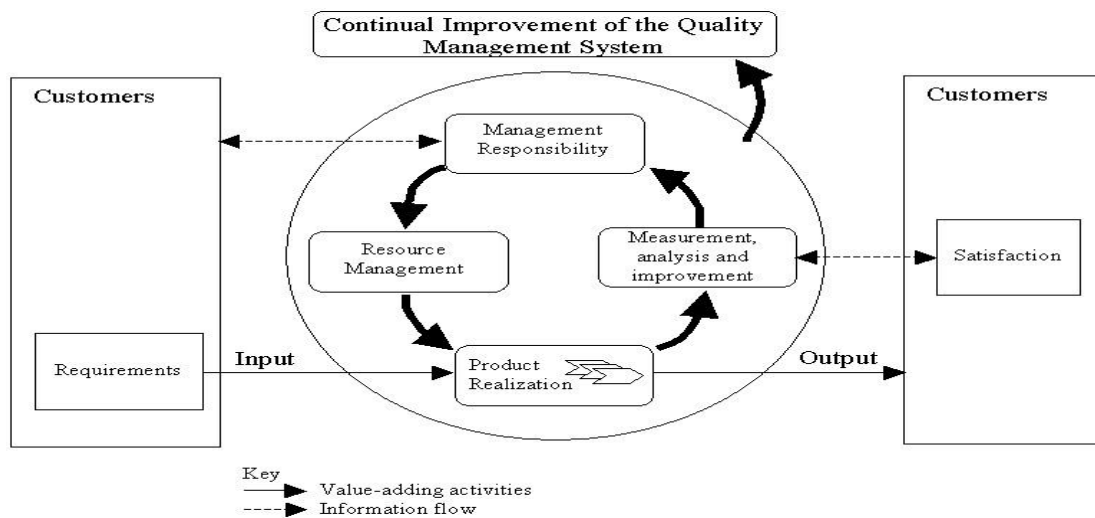
2.5 Quality Management Systems

A QMS can be defined as ‘a set of coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance. These activities interact and are affected by being in the system, so the isolation and study of each one in detail will not necessarily lead to an understanding of the system as a whole. The main thrust of a QMS is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced. A QMS enables an organization to achieve the goals and objectives set out in its policy and strategy. It provides consistency and satisfaction in terms of methods, materials, equipment, etc., and interacts with all activities of the organization, beginning with the identification of customer

requirements and ending with their satisfaction, at every transaction interface. It can be envisaged as a “wedge” that both holds the gains achieved along the quality journey, and prevents good practices from slipping (www.dti.gov.uk/quality/qms, accessed on 5th august 2015).

According to Reichheld et al (1990), quality management system is a management technique used within an organization to communicate to employees what is required to produce the desired quality of products and services and to influence employee actions to complete tasks according to the set specifications. An organization seeking to establish a quality management system can be guided by the quality management principles underlying the ISO 9000 series. These principles are generic guidelines that can be adopted by an organization in setting up an internal quality management system depending on its nature and operating industry influences and challenges.

Fig.1. Model of a process based quality management system



Source:primus-tech.com

2.5.1 ISO 9001:2008 Quality Management System

ISO 9000 family of quality management system standards are meant to enable organizations to set up effective management systems with which they can meet the needs of interested parties and assure sustained success. It assist companies of various sizes in any sector to implement and operate an effective QMS by enhancing the firm's ability to design, produce, and deliver quality products and services (Sroufe & Curkovic, 2008; Wahid & Corner, 2009). The standard provides guidelines on procedures, controls and documentation for a QMS to help a company identify mistakes, streamline its operations and maintain a consistent level of quality (Karth, 2004). This standard requires a company to first document and to implement its systems for quality management and then to verify by means of an audit conducted by an independent accredited third party for compliance of those systems to the requirements of the standards

Several research studies have been done on the influence of a quality management system on operational performance. Terlaak and King (2000) in their study found that, the implementation of practices such as ISO 9000 can raise organizational performance and result in real competitive advantage. However, ISO 9001 certified organizations cannot be deemed to be managed based on the quality management approach; managers ought not to make decisions to achieve certification but to adopt a management approach and certification ought to be a secondary objective, if not a by-product, in any initiative involving a management framework. (Okwiri, 2014). Okwiri further in his paper; 'ISO 9001 quality management system audit as an organizational effectiveness evaluation tool' (2013), notes that certification status by itself is not an indicator of effectiveness.

The ISO 9001:2008 international standard gives the requirements for developing a quality management system. It promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system, to enhance customer satisfaction by meeting customer requirements (ISO 9001:2008 standard page v). This is facilitated through the following eight quality management principles which are generic in nature: customer focus, continual improvement, leadership, involvement of people, process approach, system approach to management, factual approach to decision making as well as mutually beneficial supplier relationships (Colling and Harvey, 1995). As noted in this standard, for an organization to function effectively, it has to determine and manage numerous linked activities. An activity or set of activities using resources, and managed in order to enable the transformation of inputs into outputs, can be considered as a process. Often the output from one process directly forms the input to the next.

2.5.2 ISO 22000:2005 Food Safety Management System

FSMS 22000 takes a systematic approach to managing the various processes involved in any kind of food safety management system. It takes the view that making any kind of product involves a set of interrelated activities, including: identifying requirements, product realization, measurement, analysis and improvement, management responsibility, and resource management. Consideration for these interrelated activities is critical to ensuring the rigor of the system at preventing a catastrophic failure (vel pillay). In order for the deployment of the FSMS to be successful, management systems and management commitment must become a way of doing things throughout the whole organization. This may require a transformation in the way an organization perceives its environment and its role in that environment. Once management

systems become the way in which people work within an organization, it will become the core to any initiative launched by that organization. Where this happens, the same management system could then be used to launch a quality system, an environmental system or a safety system. In addition to management commitment, process control within the FSMS is critical to ensuring that food safety hazards that may be reasonably expected to occur are identified, evaluated and controlled in such a manner that the product does not directly or indirectly harm the consumer. In this way, the importance of process control cannot be over-emphasized.

FSMS is a network of interrelated elements that combine to ensure that food does not cause adverse human health effects. These elements include programs, plans, policies, procedures, practices, processes, goals, objectives, methods, controls, roles, responsibilities, relationships, documents, records, and resources (fssai.gov.in, accessed on 16th august 2015). To ensure food safety, organizations should take a systematic approach to managing the various processes involved in any kind of food safety management system and throughout their organization. To do this, it should be understood that an important part of ensuring food safety means taking the view that making any kind of product involves a set of interrelated activities and that management of these interrelated activities is critical to ensuring the rigor of the system (vel pillay).

Food safety is related to the presence of food-borne hazards in food at the point of consumption (intake by the consumer). As the introduction of food safety hazards can occur at any stage of the food chain, adequate control throughout the food chain is essential. Thus, food safety is ensured through the combined efforts of all the parties participating in the food chain. This International Standard specifies the requirements for a food safety management system that combines the following generally recognized key elements to ensure food safety along the food chain, up to

the point of final consumption: interactive communication, system management, prerequisite programs, Statutory and regulatory requirements and HACCP principles. The aim of this International Standard is to harmonize on a global level the requirements for food safety management for businesses within the food chain (American society for quality).

2.5.3 Good Manufacturing Practices (GMP)

A GMP is a system for ensuring that products are consistently produced and controlled according to quality standards. It is designed to minimize the risks involved in any production that cannot be eliminated through testing the final product. GMP covers all aspects of production from the starting materials, premises and equipment to the training and personal hygiene of staff. Detailed, written procedures are essential for each process that could affect the quality of the finished product. There must be systems to provide documented proof that correct procedures are consistently followed at each step in the manufacturing process - every time a product is made (ISPE website).

GMP guidelines are not prescriptive instructions on how to manufacture products. They are a series of general principles that must be observed during manufacturing. These guidelines provide guidance for manufacturing, testing, and quality assurance in order to ensure that a food or drug product is safe for human consumption. When a company is setting up its quality program and manufacturing process, there may be many ways it can fulfil GMP requirements. It is the company's responsibility to determine the most effective and efficient quality process. The quality is built into the product and GMP is the most essential part of ensuring this product quality (Wikipedia, accessed on 18th august 2015). These guidelines follow the following basic principle: hygiene, controlled environmental conditions, clearly defined and controlled

manufacturing processes, good documentation practices, keeping records manually or by instruments during manufacture, a product recall system and examination of consumer complains.

2.5.4 GLOBAL GAP

GLOBAL GAP is a private sector body that sets voluntary standards or Good Agricultural Practices (GAP) for the certification of agriculture, including some aquaculture, products around the globe. It began as EUREP GAP in 1997 as an initiative by retailers from the Euro-Retailer Produce Working Group (EUREP). British retailers and supermarkets in continental Europe were the key players in developing the standards, in response to the growing concerns of consumers about the safety, animal welfare, environmental and social impacts of their food. Over the next ten years EUREP GAP gained in global significance and was re-branded GLOBAL GAP in 2007 (greenpeace, 2010).

Good Agricultural Practices, more commonly referred to as GAPs, are "practices that address environmental, economic and social sustainability for on-farm processes, and result in safe and quality food and non-food agricultural products" (FAO COAG 2003 GAP paper). They are a set of recommendations and general guidelines that can help improve the quality and safety of the produce grown and can be adapted and/or incorporated into any production system. GAPs focus on four primary components of production and processing: soil, water, hands, and surfaces. The objective of GAP codes, standards and regulations include, to a varying degree: ensuring safety and quality of produce in the food chain, capturing new market advantages by modifying supply chain governance, improving natural resources use, workers health and working conditions, and/or creating new market opportunities for farmers and exporters in developing countries.

Appropriate adoption and monitoring of GAP helps improve the safety and quality of food and other agricultural products. It may also help reduce the risk of non-compliance with national and international regulations, standards and guidelines (in particular of the Codex Alimentarius Commission, World Organisation for Animal Health (OIE) and the International Plant Protection Convention IPPC regarding permitted pesticides, maximum levels of contaminants (including pesticides) in food and non-food agricultural products, as well as other chemical, microbiological and physical contamination hazards. Its adoption helps promotes sustainable agriculture and contributes to meeting national and international environment and social development objectives (FAO, 2008).

2.5.5 Verification and Certification

The coffee sector widely applies two different conformity assessment processes: certification and verification. Certification is defined as a “third party attestation related to products, processes, systems or persons” (International Organization for Standardization, 2005). The definition of verification is “confirmation through the provision of objective evidence, that specified requirements have been fulfilled”. Typically, verification is used to define conformity assessment for internal processes and assurances, whereas certification is used to make claims with respect to external stakeholders. Practically speaking, both certification and verification can entail many of the same processes, even through the use of third parties to carry out the conformity assessment process; the main distinction rests with the formality and legal responsibilities associated with the verification process (IISD, 2014).

An organization must perform internal audits to check how its quality management system is working. Alternatively, it might invite its clients to audit the quality system for themselves. The

assessment of a quality system against a standard or set of requirements by internal audit and review is known as a *first-party* assessment or approval scheme. If an external customer makes the assessment of a supplier against its own, or a national or international standard, a *second-party* scheme is in operation. The assessment by an independent organisation, not connected with any contract between the customer and supplier, but acceptable to them both, is an *independent third-party* assessment scheme. The latter usually results in some form of certification or registration by the assessment body. For third-party certification schemes to be of value they need to be backed by accreditation. An advantage of third-party certification, when backed by accreditation, is the assurance that it provides to customers that obviates the requirements for their own detailed checks but in addition it enables the certified organization to use the renowned accreditation mark to denote this assurance (bexcellence .org, accessed on 13th august 2015). Certification to management system standards is however not a requirement, organizations can still benefit from implementing these standards without having to be certified to them (ISO, 2008).

2.6 Quality Management Principles

The eight quality management principles are defined in ISO 9000:2005, Quality management systems – Fundamentals and vocabulary, and in ISO 9004:2009, managing for the sustained success of an organization – A quality management approach. These principles namely Customer focus, Leadership, Involvement of people, Process approach, System approach to management, Continual improvement, Factual approach to decision making and Mutually beneficial supplier relationships can be used by senior management as a framework to guide their organizations towards improved performance. An effective QMS must ensure that the organisation has a strong

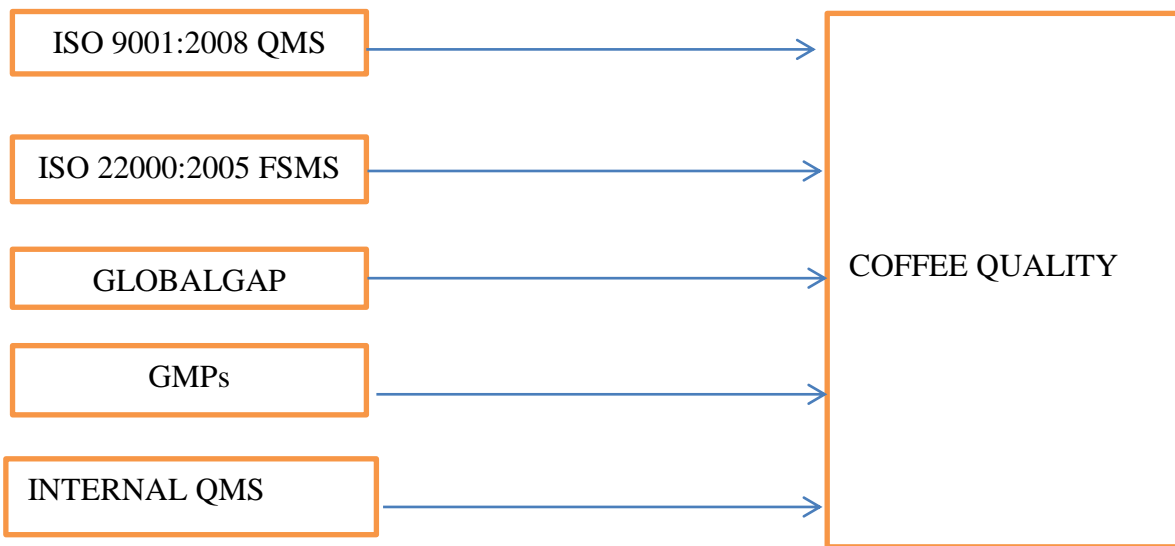
Customer Focus; Organizations depend on their customers and therefore should understand current and future customer needs and expectations and convert them into product requirements.

Top management have to demonstrate *Leadership* and provide unity of purpose through appropriate quality policy, ensuring that measurable objectives are established, and demonstrating that they are fully committed to developing, sustaining and improving the QMS and at the same time create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives. Therefore, Managers must also ensure that there is *Involvement of People* at all levels in the organisation as people at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit. This includes ensuring that there is awareness of the importance of meeting customer requirements and responsibilities in doing this, and people are competent, on the basis of appropriate training and experience (www.iso.org, accessed on 15th August 2015).

An effective QMS must also be a strategic tool designed to deliver business objectives, and must have, at its core, a *Process Approach*, with each process transforming one or more inputs to create an output of value to the customer. The key business processes may be supported by procedures and work instructions in those cases where it is judged necessary to rigidly define what rules are to be followed when undertaking a task. Most organisations will have core business processes that define those activities that directly add value to the product or service for the external customer, and supporting processes that are required to maintain the effectiveness of the core processes. The understanding of the many interrelationships between these processes demands that a *Systems Approach* to management is adopted. The processes must be thoroughly understood and managed so that the most efficient use is made of available resources, to ensure

that the needs of all the stakeholders (customers, employees, shareholders and the community) are met. Customer satisfaction is a constantly moving entity depending on changes in technology and the market place, so an effective QMS must be in a state of *Continual Improvement*. For this to be achieved, attention needs to be given to both the voice of the customer through complaint analysis, opinion surveys and regular contacts and the voice of the processes through measurement, monitoring and analysis of both process and product data resulting to *Factual Decision Making*. Continual improvement of the organization's overall performance should be a permanent objective of the organization Each organisation is itself only a link in the chain of a larger raw material process, and for the long term needs of the community and the organisation there needs to be *Mutually Beneficial Supplier Relationships* to enhance the ability of both the organization and the supplier to create value (ISO website).

Conceptual framework



Independent variables

Dependent variable

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives the details of the methodology that was used in this study. The chapter gives details on research design, the population of the study, data collection, analysis and presentation.

3.2 Research design

The study adopted a descriptive design. According to Owlia and Aspinwall (1996), descriptive research portrays an accurate profile of persons, transactions/events, or situations.

3.3 Study Population

The target population for this study was coffee cooperative societies in Nyeri County, Kenya. Nyeri county was chosen as according to the Kenya coffee directory, it has the largest annual small holder production at 6630 metric tons (data collected between 2008 and 2012). The active cooperatives as per this coffee directory in Nyeri County are 23 in number thus making a target population of 23 cooperative societies. The target respondents were the cooperatives' members of management.

3.4 Sample design

A census was done for the number of cooperatives listed as active in the Kenya coffee directory (2012).

3.5 Data collection

Primary data was collected through self-administered questionnaires.

3.6 Data analysis

The data was first checked for completeness, consistency and accuracy. It was then fed into a computer using the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistics that is the percentages, mean and the standard deviation were used to analyze data for the first and second objectives that is to establish the quality management systems in use by the cooperative societies in the small scale coffee subsector and to determine extent of quality Management systems adoption by the cooperative societies in the small scale coffee subsector. Regression analysis was employed in order to achieve objective three that is to establish the impact of adopted quality management systems on coffee quality as summarized below.

Objective no.	Objective statement	Analysis
i & ii	To establish the quality management systems being used by the cooperative societies in the small scale coffee subsector and their extent of adoption.	Descriptive statistics i.e. percentages, mean and standard deviations
iii	To establish the influence of the quality management systems on the quality of coffee	regression analysis

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

The purpose of this study was to establish the quality management systems and their impact on coffee quality in small scale coffee subsector. The study sought to achieve this through three objectives: to establish the quality management systems in use by the cooperative societies in the small scale coffee subsector ; to determine extent of quality Management systems adoption by the cooperative societies in the small scale coffee subsector and to establish the impact of adopted quality management systems on coffee quality. Data was successfully collected from 20 cooperatives out of the targeted 23 cooperative societies providing a response rate of 87%.

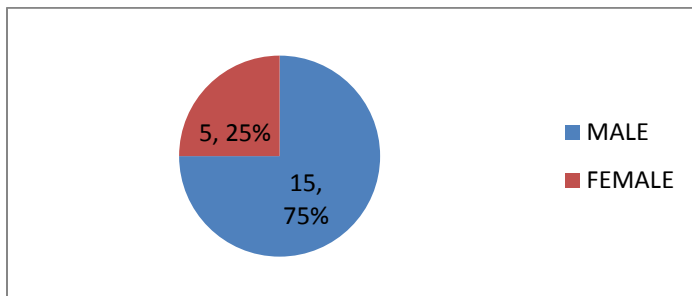
4.2 General information

The general information sought in this study was the gender of the respondents and the respondent designation.

4.2.1 Gender of the respondents

The distribution of the gender of the respondents in this study was found to be as presented in figure 4.1 below. 75% of the respondents were male while 25% were female.

Fig. 4.1 gender distribution of the respondents



4.2.2 Respondents designation

Although the target respondents for this study were members of management, the researcher sought to establish the specific job titles and the results were as presented in the table 4.1 below.

Table 4.1: Job title of the respondents

Job title	No. of respondents/ frequency
Secretary manager	16
Production manager	3
Production assistant	1

4.3 Quality management systems in use by the cooperative societies

The first objective of the study was to establish the quality management systems adopted by the coffee farmer cooperative societies. The respondents were asked to state whether or not the cooperative was using a quality management system and if yes, indicate whether the quality management system being used by the cooperative is either; internal or external, custom made or adopted and whether it is self-imposed or regulator imposed. The respondents who indicated that they were using an external quality management system were further required to indicate the specific quality management system from the provided list of; ISO 9001:2008, ISO 22000:2005, GLOBAL GAP and Good Manufacturing practices. The results were as presented in the table below.

Table 4.2: QMS type

	Custom made	Adopted		Specific QMS
Internal	16	2	Self-imposed	
External		2	Self-imposed	ISO 9001:2008

All the 20 respondents indicated that their respective cooperatives were using a quality management system. 18 (90%) respondents indicated that their QMS was internal with 10(56%) of them being custom made and 8(44%) being adopted. 2(10%) respondents indicated that their QMS was external meaning that they were certified by a third party. All the respondents further indicated that their QMS was self-imposed.

4.4 Extent of adoption of the quality management system

The study sought to establish the extent to which the quality management systems in use have been adopted. This was done using the eight quality management principles namely; customer focus, leadership, involvement of people, process approach, system approach, continual improvement, factual approach to decision and mutually beneficial supplier relationship which are basic components of any quality management system. The respondents were required to indicate the extent to which they agreed with the statements put forward under each and every principle. The responses were given scores as follows; strongly agree had a score of 5, agree had a score of 4, neutral had a score of 3, disagree had a score of 2 and strongly disagree a score of 1. For each of the statements explored in the quality management principles, the scores of the responses were summed up and divided by the total number of respondents to give a mean score of the response; a standard deviation of the responses was also computed. A mean score greater

than 3.5 meant that the aspect/principle had been adopted while a mean score less than 2.5 meant that the aspect/principle was not adopted; on the other hand a mean score between 2.5 and 3.5 meant that the respondents were neutral on whether or not the aspect/principle was adopted. The actual responses in terms of the percentages of the number of respondents who gave a particular (from 1 to 5) score was also computed in order to give a clear picture of the actual distribution of the scores.

4.4.1 Customer focus

The study sought to know the respondents level of agreement with statements related to cooperatives' being customer focused. This was achieved through use of five (5) elements of customer focus and the results were as presented in the table 4.3 below

Table 4.3: customer focus

Elements of customer focus	Mean	Std. Deviation	% of respondents rating				
			1	2	3	4	5
1. Cooperative carries out studies to evaluate customer satisfaction	2.95	1.317	15	25	25	20	15
2. Cooperative carries out market studies to determine its customers' needs	2.7	1.342	25	15	40	5	15
3. Cooperative has a system to collect customers' complaints.	2	1.167	50	15	20	15	0
4. Corrective actions are always taken to address customer complaints.	2.75	1.251	20	20	35	15	10

5. All expectations of our external customers are met.	2.2	1.196	35	30	20	10	5
Average	2.52	1.283	29	21	28	13	9

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: Research project data

From the findings in the table 4.3 above, two of the elements tested had a mean score below 2.5 while the four others had a mean score between 2.5 and 3.5. This therefore means that, the respondents were of the view that; the two elements i.e. corrective actions are always taken to address customer complaints and all expectations of our external customers are met were not adopted while they were neutral on whether the other four elements were practiced. An overall mean score of 2.5 shows that, generally the cooperative societies have not embraced this principle. A standard deviation of 1.3 indicates that, there was modest variability with regard to the responses of the perceived extent of adoption of the customer focus principle of quality management. Moreover, 42% (on average) respondent clearly indicated that they did not agree that the principle was being practiced as shown in the table 4.1 above; only 22% of the cooperatives indicated to be practicing the principle.

4.4.2 Leadership

In relation to leadership, 5 elements were examined and the results were as presented in the table 4.4 below.

Table 4.4: Leadership

Elements of leadership	Mean	Std. Deviation	% of respondents rating				
			1	2	3	4	5
1. Management is actively involved in quality improvement	2.25	1.069	30	30	25	15	0
2. Top management pursues long term quality objectives	2.5	1.357	35	10	35	10	10
3. Management quality objectives are disseminated to all employees	2.7	1.454	35	5	25	25	10
4. Management provides the necessary resources to carry activities efficiently	2.8	1.105	10	35	25	25	5
5. Management encourages employees to consider customer's needs & expectations	3.05	1.276	5	40	20	15	20
Overall	2.66	1.265	23	24	26	18	9

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

From the findings above, all the elements under examination recorded a neutral mean with an average 26% of the respondents giving a neutral (3) score. A further average total of 47% respondents disagreed that the principle was being put to use. With only 27% of the respondents being in agreement that the principle was adopted and a mean of 2.66 for all the responses; it can therefore be concluded generally that the leadership principle is not a common practice in the subsector.

4.4.3 Involvement of people

The study also sought to examine the extent to which the cooperative societies were practising involvement of people as a component of quality management system and the results were as presented in the table 4.5 below.

Table 4.5: involvement of people

Elements	Mean	Std. Deviation	% of respondents rating				
			1	2	3	4	5
1. Management lets employees participate in achieving organizational objectives	2.4	1.314	35	20	20	20	5
2. Employees are encouraged to be totally involved in issues of quality management	2.4	1.392	40	15	15	25	5
3. Employees are responsible for the tasks they perform and inspect their own work	2.5	1.147	25	20	40	10	5
4. Supervisors respect the work related opinion of their subordinates	3	1.376	15	25	25	15	20
5. Employees cooperate with their colleagues to work in team	2.85	1.039	10	25	40	20	5
6. There are frequent work related meetings with colleagues	2.15	1.136	40	20	25	15	0
Average	2.55	1.249	26	21	28	18	7

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

All the six elements tested under this principle recorded a mean score of less than 3.5. The average overall mean was 2.6 with a standard deviation of 1.2 as shown in the table 4.5 above. This could therefore be interpreted to mean that all the participating cooperatives were of the view that the involvement of people principle was not a common practice by the cooperatives. This is further supported by the large number of respondents (75%) who rated the extent of adoption of the principle as either 1, 2 or 3 i.e. strongly disagree, disagree and neutral respectively.

4.4.4 Process approach

The process approach principle was rated on two elements and the findings were as presented in the table 4.6 below.

Table 4.6: process approach

process approach	mean	std. Deviation	% of respondents rating				
			1	2	3	4	5
1. The cooperative has a process management approach	2.75	1.070	10	35	30	20	5
2. Processes are continuously improved	2.9	1.294	20	15	30	25	10
Average	2.825	1.174	15	25	30	23	7

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

As shown in the table 4.6 above, the mean rating for the two elements was 2.75 and 2.9 which lies between 2.5 and 3.5. On average, 30% of the respondents gave a score of 3 which is neutral

and a further 40% disagreed with having adopted the principle. With a total average 70% of the responses being neutral, disagree and strongly disagree, it therefore supports the mean implication that the adoption of the principle was not evident.

4.4.5 System approach

The system approach principle was examined using three elements and the results presented in table 4.7 below.

Table 4.7 system approach

system approach	mean	Std. Deviation	% of respondents rating				
			1	2	3	4	5
1. Interdepartmental groups are common	2.3	1.218	30	35	15	15	5
2. The cooperative uses quality circles	2.35	1.308	35	20	30	5	10
3. There is no bureaucracy in the cooperative	2.75	1.164	15	25	40	10	10
	2.467	1.227	26	27	28	11	8

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

Both the scores' mean and the proportion of respondents who were neutral or disagreed with the principle having been adopted implied that the principle has not been embraced by the cooperative societies in this study. The responses average mean was 2.467 with an average 26%

scoring strongly disagree, 27% disagree and an average 28% neutral. Only an average 19% of the respondents were of the view that they were practicing the principle.

4.4.6 Continual improvement

The study also explored the continual improvement principle and presented the findings in the table 4.8 below.

Table 4.8: continual improvement

Continual improvement	mean	std. deviation	% of respondents rating				
			5	4	3	2	1
1. Cooperative has clear quality goals	2.35	1.348	35	25	20	10	10
2. There are regular self-inspection and quality audits excises.	2.35	1.137	25	35	25	10	5
3. Quality management system in our cooperative is improved continuously	2.35	1.182	30	30	15	25	0
4. The cooperative provides continuous training for its managerial personnel.	2.3	0.978	30	15	50	5	0
5. The cooperative provides continuous training for its non-managerial personnel	2.55	0.944513	20	15	55	10	0
6. The effectiveness of undertaken trainings is always assessed	3.05	1.503	25	10	20	25	20
Average	2.49	1.202	28	21	31	14	6

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

From the findings in the table 4.8 above, all the elements of continual improvement had a mean score below 3.5 indicating that the principle was not to a greater extent adopted. This was supported by the large number of scores of 3 and below i.e. neutral, disagree, strongly disagree with an average score of 31%, 21% and 28% respectively.

4.4.7 Factual approach to decision making

The study sought to find how elements of factual approach to decision making were adopted and presented the findings in the table 4.9 below.

Table 4.9: factual approach to decision making

	mean	Std. Deviation	% of respondents rating				
			20	25	15	30	10
1. Relevant data is always made available when required	2.85	1.348	20	25	15	30	10
2. Data is always analysed using valid methods	2.3	1.174	35	15	40	5	5
3. Decisions are made based on data analysis and factual information	2.7	1.525	30	20	20	10	20
Average	2.62	1.354	28	20	25	15	12

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

All the elements were found to have a mean score less than 3.5 with majority of the respondents indicating that the elements were either not practiced or could not agree nor disagree with the

statements put forward. This therefore implies that the principle is not a common practice in the target cooperatives.

4.4.8 Mutually beneficial supplier relationship

Five elements were provided for rating in determining the extent of adoption of the mutually beneficial supplier relationship principle. The results were as presented in the table 4.10 below.

Table 4.10: Mutually beneficial supplier relationship

	mean	std. deviation	% of respondents rating				
			1	2	3	4	5
1. The cooperative works in close collaboration with suppliers to improve processes.	2.4	1.314	30	30	20	10	10
2. The cooperative gives technical assistance to its farmers.	2.95	1.145	10	25	35	20	10
3. farmers are aware of the quality standards expected	2.6	1.313	20	35	25	5	15
4. farmers are frequently trained on good agricultural practices	2.65	1.039	15	25	45	10	5
5. farmers use the acquired skills after training	2.45	1.276	30	25	20	20	5
Average	2.61	1.213	21	28	29	13	9

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

From the findings in the table 4.10 above, the principle has not been well adopted as the mean score is 2.61 supported by 49% of respondents in disagreement the same and an average 29% who were neutral.

4.4.9 Summary of the extent of adoption

Table 4.11: summary of the extent of adoption of QMS

Principle	Mean	Std. Deviation	% of respondents rating				
			1	2	3	4	5
1. customer focus	2.520	1.283	29	21	28	13	9
2. leadership	2.660	1.265	10	35	25	25	5
3. involvement of people	2.550	1.249	26	21	28	18	7
4. process approach	2.825	1.174	15	25	30	23	7
5. system approach	2.467	1.228	26	27	28	11	8
6. continual improvement	2.492	1.202	28	21	31	14	6
7. factual approach to decision making	2.617	1.354	28	20	25	15	12
8. mutually beneficial supplier relationship	2.610	1.214	21	28	29	13	9
Average	2.574	1.244	25	23	28	16	8

Rating scores: 5=strongly agree, 4= agree, 3=neutral, 2=disagree and 1=strongly disagree.

Source: research project data

From the findings in the table 4.11 above, all the eight principles had a mean score above 2.5 but below 3.5. This therefore implies that though the cooperative societies indicated to have had quality management systems, their extent of adoption is very minimal as per the responses registered. The participating cooperatives were neutral on the extent of adoption registering an

overall mean of 2.574 and a standard variation of 1.244 showing that there was moderate variation in their responses. As indicated in the table, only an average total of 24% of the cooperatives were in agreement that the components/principles of the quality management systems were being practiced with the rest 76% being neutral or in disagreement.

4.5 Impact of quality management systems on coffee quality

The study sought to establish the impact of QMSs on coffee quality. Various coffee quality indicators were rated on a scale of 1 - 5 and an average of the responses computed as coffee quality index. The average responses on the extent of adoption of quality management systems as per each and every principle were also obtained. These averages were as presented in the table 4.12 below. Further, the impact of individual QMS adopted was also evaluated; responses were grouped according to the specific quality management system the cooperatives had adopted; in this case, the ISO 9001:2008 quality management system and internal quality management system.

4.5.1 Impact of extent of QMS adoption on coffee quality

An overall impact of the extent of adoption of QMS on coffee quality was evaluated using the average response of each principle and corresponding coffee quality index data presented in the table 4.12 below.

Table 4.12: average response of each principle and corresponding coffee quality index

RESPONDENT	Y	X1	X2	X3	X4	X5	X6	X7	X8
1	1.83	1.80	2.60	3.17	1.50	2.33	1.83	1.67	3.20

2	1.85	2.20	2.60	2.17	2.50	1.00	2.33	2.00	3.00
3	3.33	2.40	4.00	3.00	3.00	3.00	2.17	3.33	3.00
4	3.17	3.20	3.60	2.00	3.50	2.67	2.33	4.00	2.20
5	2.83	2.00	3.40	3.00	3.00	2.67	3.17	3.33	2.80
6	3.29	2.60	2.80	3.67	3.00	3.00	3.17	2.33	3.00
7	2.84	2.60	2.60	1.83	2.00	4.33	2.17	2.67	4.00
8	2.00	2.80	1.60	1.50	3.00	2.67	2.67	2.67	2.40
9	2.83	2.20	2.60	3.33	3.00	3.00	2.83	3.33	2.60
10	2.41	3.60	1.60	2.67	3.50	3.67	1.67	1.33	2.80
11	2.19	3.20	2.40	2.33	3.50	1.67	2.67	2.00	1.60
12	2.73	2.20	3.40	2.50	3.00	1.00	3.33	4.00	1.60
13	2.67	1.80	2.80	2.67	4.50	2.00	1.50	3.00	2.80
14	2.17	2.60	2.80	2.67	2.50	1.67	2.17	3.33	2.00
15	2.21	1.20	2.40	3.00	2.50	2.33	2.33	2.67	2.80
16	1.79	3.40	2.00	1.67	2.50	1.67	2.83	3.00	2.00
17	1.84	3.00	1.40	2.33	2.50	2.33	2.83	1.67	2.60
18	2.50	2.40	3.00	3.67	2.50	2.00	2.50	2.00	2.80
19	2.33	2.60	2.00	2.17	2.50	3.00	2.33	2.33	2.80
20	2.38	2.60	3.60	1.67	2.50	3.33	3.00	1.67	2.20

Where:

Y = Coffee quality index, X1 = Customer focus, X2 = Leadership, X3 = Involvement of people,
X4 = Process approach, X5 = System approach, X6 = Continual improvement, X7 = Factual
approach to decision making, X8= Mutually beneficial supplier relationship

The researcher applied regression model in determining the relationship and the results were as presented below.

Table 4.13: Coefficient of determination, R square

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.973 ^a	.947	.909	.148

a. Predictors: (Constant), Mutually beneficial supplier relationship, Leadership, Process approach, Involvement of people, Continual improvement, Customer focus, Factual approach to decision making, System approach

The table 4.13 above shows an adjusted R square value of 0.909. This value indicates that in general, the extent of adoption of the quality management systems as determined by the extent of adoption of the eight principles explains 90.9% of the variability in coffee quality.

Table 4.14: F test for the model- ANOVA table

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.306	8	.538	24.657	.000 ^b
Residual	.240	11	.022		
Total	4.546	19			

a. Dependent Variable: Coffee quality

b. Predictors: (Constant), Mutually beneficial supplier relationship, Leadership, Process approach, Involvement of people, Continual improvement, Customer focus, Factual approach to decision making, System approach

The study used ANOVA to establish the significance of the regression model from which an F-significance value of $p < 0.000$ was established as shown in the table 4.15 above. This shows that the regression model has 0.000 likelihood (probability) of giving wrong prediction. Therefore, the regression model is overly statistically significant, meaning that it is a suitable prediction model for explaining how extent of adoption of quality management systems impact on coffee quality.

Table 4.15: Coefficients table

Coefficients^a

Model	Unstandardized		Standardized	t	Sig.	
	Coefficients		Coefficients			
	B	Std. Error	Beta			
1	(Constant)	-2.488	.563		-4.421	.001
	Customer focus	.194	.081	.234	2.411	.035
	Leadership	.307	.060	.448	5.133	.000
	Involvement of people	.232	.062	.308	3.739	.003
	Process approach	.285	.065	.370	4.379	.001
	System approach	.205	.059	.355	3.492	.005
	Continual improvement	.194	.082	.200	2.362	.038

Factual approach to decision making	.207	.056	.334	3.715	.003
Mutually beneficial supplier relationship	.273	.108	.316	2.534	.028

a. Dependent Variable: Coffee quality

The regression equation obtained from table 4.15 above was:

$$Y=2.488+0.194X_1+0.307X_2+0.232X_3+0.285X_4+0.205X_5+0.194X_6+0.207X_7+0.273X_8$$

The model illustrates that when all variables are held constant, the value of coffee quality would be 2.488. However, holding other factors constant, a unit increase in customer focus would lead to 0.194 increase in coffee quality, a unit increase in leadership would lead to 0.307 increase in coffee quality, a unit increase in involvement of people would lead 0.232 increase in coffee quality, a unit increase in process approach would lead to 0.285 increase in coffee quality, a unit increase in system approach would lead to 0.205 increase in coffee quality, an increase in continual improvement would lead to 0.194 increase in coffee quality, an increase in factual approach to decision making would lead to 0.207 increase in coffee quality and an increase in mutually beneficial supplier relationship would lead to 0.273 increase in coffee quality.

4.5.2 ISO 9001:2008 and coffee quality

The study sought to establish the relationship between ISO 9001 quality management system and coffee quality. An ISO use index value was obtained using the responses obtained from the 10% of the cooperatives who indicated to be using the ISO 9001:2008 quality management system.

Table 4.16: coffee quality and corresponding ISO 9001:2008 use

RESPONDENT	Y	X1
1	3.33	2.99
2	2.83	2.86

Where: Y=coffee quality and X1=ISO 9001:2008 use

Table 4.17: Coefficient of determination, R square

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	1.000	.	.

a. Predictors: (Constant), ISO9001 use

The table 4.17 above gives an R square value of 100%. This therefore implies that all the variability in coffee quality for those cooperatives that were using ISO 9001:2008 are explained by the extent of use of the quality management system.

Table 4.18: Analysis of variance table

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.125	1	.125	.	^b
	Residual	.000	0	.		
	Total	.125	1			

a. Dependent Variable: Coffee quality index

b. Predictors: (Constant), ISO9001 use

Analysis of variance was used to establish the significance of the regression model. An F-significance value of $p < 0.000$ was established as shown in the table 4.18 above. This shows that the regression model has 0 probability of giving wrong prediction. The regression model is therefore overly statistically significant, hence a suitable prediction model for explaining how the use of ISO 9001 quality management systems impacts on coffee quality.

Table 4.19: Coefficients table

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-8.170	.000		.	.
ISO9001 use	3.846	.000	1.000	.	.

a. Dependent Variable: Coffee quality index

The following regression equation was obtained from the table 4.19 above:

$$Y = 8.170 + 3.846X_1, \text{ where } Y = \text{coffee quality index and } X_1 = \text{ISO 9001:2008 use}$$

The equation implies that, a unit increase in the use of ISO 9001 would result to 3.846 increase in coffee quality.

4.5.3 Internal quality management system and coffee quality

90% of the respondents indicated they were using an internal quality management system. Their responses were used in computing an internal QMS use index as the independent variable in this study.

Table 4.20: coffee quality and corresponding internal QMS use

RESPONDENT	y	X1
1	1.83	2.26
2	1.85	2.23
3	3.17	2.94
4	2.83	2.92
5	3.29	2.95
6	2.84	2.78
7	2.00	2.41
8	2.41	2.60
9	2.19	2.42
10	2.73	2.63
11	2.67	2.63
12	2.17	2.47
13	2.21	2.40
14	1.79	2.38
15	1.84	2.33
16	2.50	2.61
17	2.33	2.47
18	2.38	2.57

Table 4.21: Coefficient of determination, R square

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.959 ^a	.920	.915	.13372

a. Predictors: (Constant), Internal QMS use

As indicated in the table 4.21 above, the adjusted R square is 0.915. This means that, 91.5% of the variability in coffee quality is explained by the use of internal quality management systems.

Table 4.22: Analysis of variance table

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.279	1	3.279	183.381	.000 ^b
	Residual	.286	16	.018		
	Total	3.565	17			

a. Dependent Variable: Coffee quality index

b. Predictors: (Constant), Internal QMS use

The significance of the regression model was established using analysis of variance. An F-significance value of 0.000 was established as shown in the table 4.21 above. This implies that the regression model has 0 probability of giving wrong prediction. The regression model is therefore a suitable prediction model for explaining how the use of internal quality management systems impacts on coffee quality.

4.23: Coefficients table

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2.611	.371		-7.043	.000
Internal QMS use	1.957	.145	.959	13.542	.000

a. Dependent Variable: Coffee quality index

The following regression equation was obtained from the table 4.21 above:

$Y = 2.611 + 1.957X_1$, where Y = coffee quality index and X_1 = Internal QMS use

The equation implies that, a unit increase in the use of internal QMS would result to 1.957 increase in coffee quality.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings from the study, conclusions and the recommendations for further study. The study aimed to establish the quality management systems in operation and their influence on coffee quality in small scale coffee subsector in Kenya. The study had three objectives: to establish the quality management systems in use by the cooperative societies in the small scale coffee subsector ; to determine extent of quality Management systems adoption by the cooperative societies in the small scale coffee subsector and to establish the impact of adopted quality management systems on coffee quality.

5.2 Summary of the findings

The study established that, ISO 9001:2008 quality management system and internal (both custom made and borrowed) quality management system were the quality management systems adopted by the cooperatives in small scale coffee subsector in Kenya. All the 20 respondents indicated that their respective cooperatives were using a quality management system. . 90% of the cooperatives were using internal quality management systems while only 10% were using ISO 9001:2008 with a third party certification. All the respondents further indicated that their QMS was self-imposed

In line with the second objective which was to determine extent of quality Management systems adoption by the cooperative societies in the small scale coffee subsector, the study used the eight quality management principles as a standard measure of the extent of adoption. The study established that, all the eight principles were dismally adopted as all of them recorded a mean score of less than 3.5. On average, only 24% of the cooperatives indicated that the principles had

been adopted and practiced with 76% of the cooperatives being of the opinion that they were not practiced or remained neutral. This therefore implies a dismal adoption rate of the quality management systems.

While the extent of adoption of the quality management system was low, the study established an overly significance relationship between the extent of adoption of the quality management system and the coffee quality. Further, there was an overly significant relationship between the specific QMSs in use i.e. ISO 9001:2008 quality management system and internal QMS and the coffee quality. In all the cases, over 90% of the variation in coffee quality could be explained by the extent of use of the quality management systems.

5.3 Conclusions

The study concludes that though the coffee cooperative societies in the small scale coffee subsector have quality management systems, there is no commitment to using these systems in achieving coffee quality. As the study established a strong relationship between the use of quality management system and coffee quality, there should be more effort by the stakeholders in the industry to enforce proper utilization of quality management systems. There is need to sensitize the cooperatives' board members on the importance of supporting the use of coffee management systems.

5.3 Recommendations

The study has confirmed that the use of quality management systems is very significant in enhancing coffee quality. The study recommends that coffee farmer cooperative societies should embrace proper use and commitment to adhering to the quality management systems guidelines in order to reap the full benefits of using the QMS.

5.4 Limitations and suggestions for further research

There are limitations in this study that should be considered when interpreting the study findings. First, the study focused only on the quality management systems that are specific to the product ignoring those that aim at socially perceived value like UTZ and RFA (rain forest alliance) despite the fact that they could also be having an indirect impact on coffee quality. Another limitation was that, the study only considered those cooperative societies in Nyeri County as per the Kenya coffee directory 2012. Coffee production in Kenya takes place in over ten counties which may differ in their way of management and have different settings altogether. There is therefore need for another study which would incorporate other counties and ensure generalization of the study findings for all coffee farmer cooperative societies in Kenya and hence pave way for new policies.

The study recommends research to be carried out on the impact of other management systems in the subsector on coffee quality. The same study may also be replicated across different sectors of economy.

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APPENDICES

Appendix I: Introduction letter


UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA PROGRAMME

Telephone: 020-2059162
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, Kenya

DATE 06.10.2015

TO WHOM IT MAY CONCERN

The bearer of this letter CHARITY NYAMBURA
Registration No. 06170903/2014

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.




PATRICK NYABUTO
MBA ADMINISTRATOR
SCHOOL OF BUSINESS

Appendix II: Research Questionnaire

The respondents in this research are **any member of management**. Kindly answer the questions as truthfully as possible

Please tick your response within the appropriate box where applicable.

Section A: General information

1. Name of the cooperative _____

2. Gender of the respondent

Male Female

3. Respondent Designation _____

Section B: Quality Management System in use and extent of adoption

4. Does your cooperative have a quality management system?

Yes No

4.1 Which of the following best describes the quality management system of your cooperative

(Please mark (X) all that best describes your QMS)

i. Internal OR External

ii. Custom made OR Adopted

iii. Self-imposed OR Regulator imposed

iv. Others

4.2.1 If adopted, which of the following standards do you use

- i. ISO 9001:2008 quality management system
- ii. ISO 22000:2005 food safety management system
- iii. GLOBALGAP
- iv. Good Manufacturing Practices
- v. Any other (specify)

4.2.2 Are you certified on the above (5.2.1) standard yes No

Please mark (X) the extent to which you agree with the following statements

Customer focus

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)
Cooperative carries out studies to evaluate customer satisfaction					
Cooperative carries out market studies to determine its					

customers' needs and wants					
Cooperative has a system to collect customers' complaints.					
Corrective actions are always taken to address customer complaints.					
All expectations of our external customers are met.					

Leadership

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongy dasagree e (1)
Management is actively involved in quality improvement					
Top management pursues long- term quality objectives.					
Management quality objectives are disseminated to all employees					
Management provides the necessary resources to carry					

out activities efficiently					
Management encourages employees to consider customers' needs and expectations					

Involvement of people

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)
Management lets employees participate in achieving organizational objectives.					
Employees are encouraged to be totally involved in issues of quality management					
Employees are responsible for the tasks they perform, and inspect their own work.					
Supervisors respect the work related opinion of their subordinates					

Employees cooperate with their colleagues to work in teams					
There are frequent work related meetings with colleagues.					

Process approach

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)
The cooperative has a process management approach.					
Processes are continuously improved					

System approach

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)
Interdepartmental groups are common.					
The cooperative uses quality circles					

There is no bureaucracy in the cooperative.					
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Continual improvement

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)
Cooperative has clear quality goals					
There are regular self-inspection and quality audits excises.					
Quality management system in our cooperative is improved continuously					
The cooperative provides continuous training for its managerial personnel.					
The cooperative provides continuous training for its non-managerial personnel					
The effectiveness of undertaken trainings is always assessed					

Factual approach to decision making

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)

Relevant data is always made available when required					
Data is always analyzed using valid methods					
Decisions are made based on data analysis and factual information					

Mutually beneficial supplier relationship

Description	Strongly agree (5)	agree (4)	neutral (3)	disagree (2)	Strongly disagree (1)
The cooperative works in close collaboration with suppliers to improve processes.					
The cooperative gives technical assistance to its farmers.					
farmers are aware of the quality standards expected					
farmers are frequently trained on good agricultural practices					
farmers use the acquired skills after training					

SECTION C: relationship between QMS (quality management system) and the quality of coffee

Please rate the below statements (1 to 5) by marking (X) in the provided boxes

Statement	5	4	3	2	1
Use of a QMS improves the quality of coffee received from farmers					
Use of QMS helps retain the quality of coffee during pulping and processing					
Use of QMS has improved the cupping quality of our coffee					
Use of QMS has improved the quality of our coffee as perceived by our customers					
Use of QMS has resulted to reduced cases of coffee berry disease					

Appendix III: List of active cooperative societies in Nyeri County.

Agutrhi FCS Ltd

Rugi F.C.S Ltd

Barichu FCS Ltd

Rumukia F.C.S Ltd

Gakuyu FCS Ltd

Ruthaka F.C.S Ltd

Gikanda F.C.S Ltd

Rutuma F.C.S Ltd

New Gikaru C.G.C.S Ltd

Tekangu F.C.S Ltd

Githiru F.C.S Ltd

Thiriku F.C.S Ltd

Iria-ini F.C.S Ltd

Giakanja F.C.S Ltd

Kiama F.C.S Ltd

Gacatha F.C.S Ltd

Mathira North F.C.S ltd

Gathaithi F.C.S Ltd

Mugaga F.C.S Ltd

Njuriga F.C.S Ltd

Mutheka F.C.S Ltd

Wachuri F.C.S Ltd

Othaya F.C.S ltd

Source: Kenya coffee directory (2012)

Appendix IV: proposal correction form

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
PROPOSAL CORRECTION FORM

Student Name.....CHRISTY MAMBUWA.....
Registration Number.....DG1/70903/2014.....
Department.....MANAGEMENT SCIENCE.....
Specialization.....OPERATIONS MANAGEMENT.....
Title of Project Proposal.....QUALITY MANAGEMENT SYSTEMS
RND COFFEE QUALITY IN SMALL SCALE COFFEE
SUBSECTOR IN KEHA.....

The student has done all the corrections as suggested during the Proposal Presentation and can now proceed to collect data.

Name of Supervisor.....Z. Kiruthi.....Signature.....[Signature].....Date.....06/10/15.....