Knowledge Sharing Practices among Crop Researchers at the Kenya Agricultural Research Institute

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DECLARATION

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

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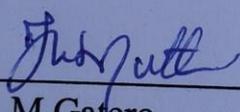
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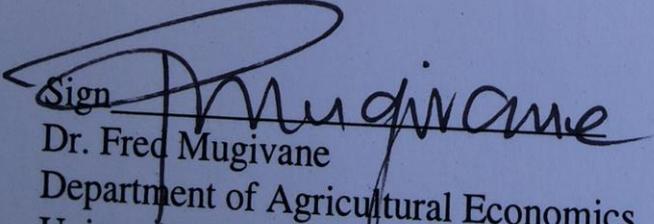
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i

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This work would not have been complete without the gracious support from my supervisors who were always ready to reach out and help when I got stuck.

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DEDICATION

This work is dedicated to God for giving me the ability to further my studies. To my husband Jessy and daughters Mitchell and Edna for making the sacrifice of time and resources to allow me pursue this degree. To my parents for encouraging me to scale greater heights.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS/ACRONYMS

CGIAR   Consultative Group on International Agricultural Research

GCARD   Global Conference on Agricultural Research for Development

GFAR   Global Forum for Agricultural Research

ICT   Information and Communication Technologies

KARI   Kenya Agricultural Research Institute

KM   Knowledge Management

KMP   Knowledge Management Practices

SECI   Socialization, Externalization, Combination and Internalization

SET   Social Exchange Theory

ABSTRACT

This study sought to explore the knowledge sharing practices employed by crop researchers at the Kenya Agricultural Research Institute (KARI). KARI accounts for more than half of both total research spending and agricultural research numbers, and has 11 main research centres strategically spread throughout Kenya. The aim of the study was to study the knowledge sharing practices among KARI crop researchers. To achieve the set objectives, the study sought to identify the extent to which different knowledge sharing methods are used, to find out factors that influence knowledge sharing among the crop researchers, to determine constraints in knowledge sharing among the researchers; and to understand how knowledge sharing at the institute can be improved. The study adopted the social exchange theory to get insights on factors that influence knowledge sharing among researchers at KARI, and adopted a qualitative approach to data collection and analysis. The questionnaire was the principal data collection tool. Data were collected from 80 crop researchers drawn from representative eight research centres. The study found the use of seminars, conferences and workshops as the most frequently used methods of knowledge sharing by researchers at KARI. The findings also indicated that the modern methods of knowledge sharing such as blogs, communities of practice, and online discussion forums were rarely used by crop researchers hence making it difficult to achieve vibrancy in the knowledge sharing process at the institute. E-mail and telephone communication were moderately used. With regard to the factors that influence knowledge sharing among researchers, the study found that for majority of the crop researchers, trust determines who they share knowledge with. More than half of the researchers also felt that the rewards offered to encourage knowledge sharing at the institute were not sufficient even though there was good intra-team sharing of knowledge in research teams. The greatest constraints to knowledge sharing at the institute were identified as plagiarism and piracy and hence some of the suggestions to improve knowledge sharing were to address the challenges of plagiarism and piracy in the institute. The study recommends that KARI develops a knowledge sharing

strategy that would enhance and broaden knowledge and information sharing among the researchers.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Many organizations in Kenya and abroad have espoused the concept of Knowledge Management (KM) as one that gives them a competitive edge over others. KM has been touted as the ultimate solution to most organizations' competitiveness in this era that is the knowledge edge (Maingi, 2011). The knowledge possessed and used by an organization's personnel could be the difference between its survival and collapse. According to the Organization for Economic Cooperation and Development, because of the so-called "Knowledge Based Economy", the role of research centres, private or public, is becoming predominant. They are crucial for the production of knowledge, which is an economic asset capable of sustainable growth and a decisive competitive advantage for businesses.

For the agricultural sector, the need for KM has been championed by the Global Forum for Agricultural Research (GFAR), who state 'the need to participate in globally competitive markets, practice environmentally friendly farming and cope with rising farm input costs is making new knowledge a critical resource for agriculture. The recognition of knowledge as a critical resource for practicing efficient farming and developing agriculture makes sharing and exchange of knowledge globally vital for agricultural development'. GFAR further adds 'since agricultural research is a major source of new agricultural knowledge, improving knowledge sharing and exchange for agricultural research and development requires improving information and knowledge sharing at different levels: community, institute,

national agricultural research and innovation systems, regional organizations and forums and globally (www.gfar.org).

According to Wickramasinghe (2003), in its broadest application, KM refers to how firms acquire, apply and store their own intellectual capital. Wickramasinghe further argues that KM refers to the information systems adopted and designed, which efficiently and effectively leverage the collective experience and knowledge of employees to support information processing needs, as well as enabling and facilitating sense-making activities of knowledge workers as is the case with the researchers at the KARI.

Hicks *et al.,* (2006) articulate that knowledge management has three fundamental concepts, which include: data, information and knowledge. They explain that *data* is a set of records and represents a fact or statement of event and *information* is formed when we attach semantics to the data; when *intelligence* is attached to the information, then knowledge is created (Govil, 2007). This shows that there is a great relationship between data, information, and knowledge. Others distinguish between raw information and knowledge. They state that raw information is widely available to a number of organizations, but only some organizations are able to convert it to relevant knowledge and to use this knowledge to achieve their aims (Holvand, 2003).

Gammelgaard (2007) argues that individuals are disposed to hoard the knowledge they possess. And therefore, as people leave, organizations have come to realize that they take with them valuable knowledge. To counteract this, the leadership factor is very important. Ramirez (2007) posits that

management needs to support knowledge sharing in the organization and provide visible support to motivate the employees to share their knowledge. According to Bock and Kim (2002), knowledge sharing has been considered the most important part of KM. The ultimate goal of sharing employees' knowledge is its transfer to organizational assets and resources. As Inkpen puts it, "unless individual knowledge is shared throughout an organization, the knowledge will have a limited impact on organizational effect. The goal of knowledge sharing therefore can either be to create new knowledge by differently combining existing knowledge or to become better at exploiting existing knowledge.

Knowledge sharing has been defined differently in literature. Bartol and Srivastava (2004) define knowledge sharing as the action in which employees diffuse relevant information to others across the organization. For purposes of this study, knowledge sharing is defined as 'the wilful application of one's ideas, insights, solutions, experiences (i.e. knowledge) to another individual either via an intermediary, such as a computer-based system, or directly (Turban *et al*., 2004).

To activate knowledge movement directly across individuals and indirectly through a repository, it is important to involve individuals in knowledge sharing activities (Bock and Kim, 2002). In KARI, knowledge sharing is captured as one of their core guiding functions (http://www.kari.org/node/1).

However, Davenport and Prusak (1998), argue that knowledge sharing is often unnatural because people think that their knowledge is valuable and important.

Generally, people who possess great amounts of knowledge are unwilling to share it. Previous research has revealed that the biggest challenge organizations face with regard to KM is "changing people's behavior," particularly with regard to knowledge sharing (Ruggles, 1998). In addition, Drucker contends that the basic economic resource in Africa would no longer be capital or natural resources or even labour but knowledge.

The mainstay of most countries in Africa, Kenya included, is agriculture. In fact Kenya's economy is dependent on agriculture with 75% of its 39 million people making their living from farming. Kenya knows the importance of research to enhance agricultural productivity as exemplified by the superior crop varieties, veterinary services and environmental conservation (CGIAR, 2003). Agricultural research in Kenya has therefore generated a lot of information that remains largely unutilized in academic libraries and research institutions.

Knowledge management has several areas that include knowledge management systems, knowledge management practices, knowledge management broker and others. This study was concerned with knowledge sharing practices at the KARI.

1.2 Statement of the problem

Agriculture is the mainstay of Kenya's economy accounting for 60% of national employment and earning 45% of government revenue. It is knowledge intensive and thrives on the provision of tried and tested

techniques mostly developed by agricultural researchers in the course of their work.

Researchers spend most of their time looking for new and innovative technologies or techniques that improve crop production. These techniques and technologies constitute new knowledge that needs to be shared. In fact, according to Merton (1973) scientists working for universities and public research institutions are supposed to be guided by the ethos of the unconditional sharing of knowledge. This norm is referred to as "communism" or "communalism". It postulates the common ownership of scientific discoveries, according to which scientists give up intellectual property rights in exchange for recognition and esteem. However, purposeful withholding of research advances and data has frequently been reported in academic science (Blumenthal *et al.,* 1996; Walsh *et al.,* 2007), These studies suggest that in academic science [and public research] there is information sharing as well as withholding among scientists, yet this issues have not received adequate attention.

It is a known assumption that the main method used to disseminate academic and public research results are peer reviewed journals. Internal sharing of new knowledge or results among researchers in an institution may not be common as only a limited number of institutions have an elaborate system where research findings are shared.

Knowledge sharing systems are also known to exist in industry research where industrial firms like Apple and Xerox engage in research to improve their products and services. The case is however different for public research where

a lot of scientific knowledge generated, but it has not been established whether such knowledge is shared among the researchers.

It is in this light of this information that this study sought to look into knowledge sharing among researchers in a public research institution in Kenya. KARI was selected as the institution of choice due to the agricultural bias of the course being undertaken and the fact that KARI is the biggest agricultural research institute in the country. The study comes at an opportune moment to provide insights into one of the leading research institutes in the country.

1.3 Objectives of the study

The broad objective of this study was to investigate the knowledge sharing practices among crop researchers at Kenya Agricultural Research Institute.

1.3.1 Specific objectives

This study sought to achieve the following specific objectives:

1. To identify methodologies for knowledge sharing and the extent to which they are used by crop researchers.
2. To identify factors that influence knowledge sharing among these researchers.
3. To determine constraints in knowledge sharing among crop researchers at KARI.

1.3.2 Research questions

The following research questions guided the study:

1. Which knowledge sharing methods do crop researchers at KARI use?

2. What factors, personal and institutional, influence knowledge sharing among crop researchers at KARI?

3. What challenges do researchers encounter in the process of knowledge sharing at KARI?

4. How can knowledge sharing among agricultural researchers be improved?

1.4 Significance of the study

The findings from this study will provide insights for researchers and top level managers at KARI. For researchers, the study will provide an assessment of their contribution to knowledge sharing. It will also help them know how they can improve knowledge sharing amongst themselves besides how to overcome any barriers they may be experiencing. Increased collaboration among researchers, through knowledge sharing can also help create synergy in the institution where knowledge gained in one unit can feed or help another unit and thus avoid duplication and competition among the different units.

Top level management at KARI will know what challenges researchers are facing in trying to share knowledge and help solve them. They will also be able to facilitate increased knowledge sharing through fostering social networks among researchers. Such activities will only be achievable when management is willing to commit the resources required to achieve greater knowledge sharing.

Other research institutions will also be able to assess the levels of knowledge sharing in their institutions based on the research conducted or use the findings to build stronger knowledge sharing networks. In the view of the global shift from an information age to knowledge economies, a study on knowledge sharing will help provide a framework that managers can use to encourage knowledge sharing in other organizations in the country and thereby speed up the shift towards a knowledge economy.

1. 5 Scope and limitations of the study

The study was limited to the national agricultural research institution in Kenya, that is, KARI. It was picked as a case study for several reasons. It is a public research institution that accounts for more than half of both total research spending and agricultural research numbers (CGIAR, 2003). Secondly, it has 23 research centres strategically spread throughout the eight regions of the country which means that a study involving the institution's researchers would be more comprehensive as compared to using any other specialized research institute in the country. In addition, it is involved in local research with a mandate to focus on land and water management, food crops, horticulture and industrial crops, livestock production and health, and socioeconomics (KARI, 2005). It is also a public research institution.

The study was limited to researchers in crops. This limitation was necessitated by the large number of researchers in KARI and the variability that results from their areas of specialisation. This studies' limitation to a specific branch of research allows for a more detailed examination of knowledge sharing practices in the institution.

CHAPTER TWO

LITERATURE REVIEW

2.1 What is knowledge?

A review of literature provides numerous definitions of knowledge. However, to get a clear definition, there is need to look at other closely related terms like data and information. Meadows, *et al.,* (2000), refer to data as "a string of elementary symbols, such as digits or letters." Wiig (1999) defines information as facts and data organized to characterize a particular situation and knowledge as a set of truths and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how. Therefore, information can be seen as data made meaningful by being put into context and knowledge as data made meaningful through a set of beliefs about the causal relationships between actions and their probable consequences, gained through either inference or experience (Mitchell, 2000). Knowledge differs from information in that it is predictive and can be used to guide action while information is merely data in context.

In organizations knowledge is frequently categorized into typologies. Nonaka and Takeuchi (1995) identify two types of knowledge i.e. tacit and explicit knowledge. According to these writers, tacit knowledge is defined as action-based, embedded in practice, and therefore cannot be easily explained or described, but is considered to be the fundamental type of knowledge on which organizational knowledge is built. On the other hand, explicit knowledge is defined as knowledge that can be codified and therefore more

easily communicated and shared. Knowledge management writers view explicit knowledge as structured and conscious and therefore it can be stored in information technology (Martensson, 2000)

Nonaka and Takeuchi (1995) further describe a knowledge creation model that consists of four processes thus: a) *Socialization:* This mode usually starts with building a "field" of interaction that facilitates the sharing of members' experiences and mental models (tacit knowledge); b) *Externalization:* This is the process of articulating tacit knowledge into explicit concepts. Tacit knowledge could be converted into explicit knowledge effectively and efficiently by sequential use of metaphor, analogy and model; c) *Combination:* This is the process of combining different bodies of explicit knowledge. Reconfiguration of existing information through sorting, adding, combining and categorizing of explicit knowledge as conducted in computer databases can lead to new knowledge; d) *Internalization:* This is the process of embodying explicit knowledge into tacit knowledge. It is closely related to "learning by doing" when experiences through socialization, externalization and combination are internalized into individuals' tacit knowledge bases in the form of shared mental models or technical knowhow, they then become valuable assets. The internalization could be facilitated through documented knowledge.

2.2 Knowledge management

As knowledge emerges as the primary strategic resource for firms in the 21st century, researchers and practitioners strive for clues on how to accumulate

knowledge resources effectively and manage them for competitive advantage (Lee and Kim, 2001). Knowledge management (KM) is the combination of organizational culture, strategic goals, individual needs, and the expertise of its people to create an atmosphere of learning and growth. Philosophically, knowledge management must be a vital part of corporate principles and individual jobs for knowledge sharing to succeed. It is through its conceptual components that knowledge management becomes legitimate. Assessing and meeting each person's needs is essential to the process. Through the use of this knowledge, people and organizations can improve. As people improve, so does an organization's strategic goals.

Furthermore, Knowledge management is the process of capturing, storing, sharing and using knowledge (Davenport, 1998). Its central purpose is to transform information and intellectual assets into enduring value (Metcalfe, 2005). The basic idea is to strengthen, improve and propel the organization by using the wealth of information and knowledge that the organization and its members collectively possess (Milton, 2003). Burk (1999) adds that it helps capture the collective knowledge that ensures institutional continuity and the continued achievement of the organization's strategic objectives.

2.3 Knowledge management in organizations

In a given organization, knowledge management refers to identifying and leveraging the collective knowledge within it in such a way to help the organization compete (Alavi & Leidner 2001). Knowledge management increases innovativeness and responsiveness. Davenport and Prusak (1998)

indicate that most organisations have one of the three aims: First, to make knowledge visible and show the role of knowledge in an organization; second, to develop a knowledge intensive culture by encouraging and aggregating behaviour such as knowledge sharing (as opposed to hoarding) and proactively seeking and offering knowledge; finally, to build a knowledge infrastructure, not only a technical system, but a web of connections among people given space, time, tools, and encouragement to interact and collaborate.

Earl (2001) identifies six categories of knowledge management practice (KMP) including: leadership, knowledge capture and acquisition, training and mentoring, policies and strategies, communications and incentives. The leadership component views knowledge management practices as a responsibility of managers and executives and it is the explicit criteria for assessing worker performance. Also, KMP is a responsibility of non-management workers and a responsibility of the knowledge officer or knowledge management unit. The knowledge capture and acquisition component views firms as capturing and using knowledge obtained from other industry sources such as industrial associations, competitors, clients and suppliers and from public research institutions including universities and government laboratories. Firms dedicate resources to detect and obtain external knowledge and communicate it in the firms and encourage workers to participate in project teams with external experts. The training and mentoring component indicates that firms encourage experienced workers to transfer their knowledge to new or less experienced workers and provide informal training related to knowledge management. Again, firms encourage workers to continue their education by reimbursing tuition fees for successfully

completed work-related courses and offers offsite training to workers in order to keep skills current.

With regard to policies and strategies, firms use partnerships or strategic alliances to acquire knowledge and policies or programs intended to improve worker retention. It includes value system or culture intended to promote knowledge sharing and a written knowledge management policy or strategy. The communications component indicates that workers share knowledge by preparing written documentation such as lessons learned, training manuals, good work practices, articles for publication. (organizational memory). Moreover, workers share knowledge by regularly updating databases of good work practices, lessons learned or listings of experts. Workers also share knowledge in collaborative work by project teams that are physically separated (virtual teams).

2.4 Knowledge sharing practices

Knowledge sharing is defined as the process of exchanging knowledge (skills, experience, and understanding) among researchers (Burk, 1999). It is a tool that has been used to promote evidence-based practice and decision making, and also to promote exchange and dialogue among researchers. Effective knowledge sharing mostly takes place within a community of practice that consists of people who share a common interest and are willing to learn from each other. The concept of knowledge sharing in organizations has a very scarce theoretical background. It has been studied through human and social capital theory (Morris, Snell, Lepak, 2005) but other conceptualizations are hardly present. Literature (Szulanski, 1996, Youndt and Snell, 2004) says that

there are many reasons in an organization why knowledge sharing does not yield an optimal level. Bureaucratic and hierarchical cultures, formal and rigid structures and procedures can limit knowledge sharing. There are obstacles hindering employees in knowledge sharing and transfer. The perception of losing advantage and status through sharing knowledge is particularly important (Morris, 2001; Willman *et al.,* 2001). Many researchers have emphasized the role of rewards in sharing knowledge (Robertson and O'Malley, 2000; Hansen *et al.,* 1999).

In order to foster knowledge flows around the organization many organizations invent Human Resource Management practices to facilitate knowledge transfer. Darroch (2003) analyzed KM practices and behaviors, measured knowledge acquisition, storage, dissemination and the use of knowledge. The author found a three factor solution that determines knowledge management that, in turn, has an important impact on firm performance and innovativeness. These factors are responsiveness to knowledge (responsiveness to the customer, a well-developed marketing function, response to technology and competitors and flexible organizations); knowledge acquisition (employee attitudes and opinions, a well-developed financial reporting system, sensitivity to market changes, the science and technology profile, international partnerships with customers, market survey) and knowledge dissemination (dissemination of market information, knowledge dissemination on-the-job, techniques for dissemination, technology for dissemination, written communication).

Scarbrough and Carter (2000) suggested a framework for developing and supporting learning that will improve sharing of learning and tacit knowledge. The authors shed light on the personal nature of knowledge (and human/social capital) and the need for human motivation in sharing and utilizing knowledge (Hislop, 2003). The incentive system includes performance-based compensation and the use of internal promotion systems that focus on employee merit and help employees to overcome invisible barriers to their career growth. Promoting employees from within the firm is likely to provide a strong motivation for employees to work harder in order to be promoted (Minbeava, 2005). The theory of social capital, social dilemma theory and social exchange theory further explain the social dynamics of knowledge sharing (Cabrera and Cabrera, 2005).

Much literature on knowledge management (Davenport & Prusak, 2000; Lesser & Prusak, 2000; O'Dell & Grayson, 1999; Nonaka & Takeuchi, 1995) shows that three threads need to be incorporated with the development and emergence of knowledge sharing and storing. First, social interactions and networks play a crucial role in accelerating knowledge sharing, in assembling divergent resources from dispersed locations within an organization, and in enhancing the effectiveness of storing individual and organizational knowledge. Second, technologies can be employed for nurturing knowledge sharing and storing practices. The third thread is that top managers need to remove all obstacles that impede the development of the knowledge management best practice, and will need to weave a desired organizational culture for the promotion of knowledge management.

2.5 Tools and methodologies for knowledge sharing

Knowledge management and sharing have become part of the organisation culture. Consequently, they develop a functionality of their own within the overall organisational structure. Newman and Conrad (1999) suggest a General Knowledge Model that sequences the activity areas in a deterministic fashion. In reality, though, all but the most rigorously automated knowledge flows comprise complex systems that are built mostly from asynchronous processes. The model is valuable precisely because it relates the individual, highly dynamic behaviors and processes to general activity areas and, by association, to each other. The model proposed by Newman and Conrad consists of: a) Knowledge Creation - This comprises activities associated with the entry of new knowledge into the system, and includes knowledge development, discovery and capture; b) Knowledge Retention - This includes all activities that preserve knowledge and allow it to remain in the system once introduced. It also includes those activities that maintain the viability of knowledge within the system; c) Knowledge Transfer - This refers to activities associated with the flow of knowledge from one party to another. This includes communication, translation, conversion, filtering and rendering; and d) Knowledge Utilization - This includes the activities and events connected with the application of knowledge to business processes.

According to Polanyi (1996) knowledge artifacts do not perform actions and make decisions. Actions and decisions are undertaken by agents: people, organizations, or in some cases, technology. Agents carry out all the actions and exhibit all the behaviors within a knowledge flow. Polanyi places agents into the following categories: i) *Individual Agents* - These agents sit at the

center of almost every knowledge flow. For most analysts, the individual (human) serves as the prototypical active force for affecting change. Individual agents are capable of working with knowledge and knowledge artifacts in all degrees of abstract articulation; ii) *Automated Agents* - these agents can include any human construct that is capable of retaining, transferring or transforming knowledge artifacts. They are not exclusively computerized processes, as is often assumed in discussions of knowledge management; iii) *Organizational Agents* - these agents exist in situations in which knowledge retention and transfer cannot be fully attributed to individuals or specific automated agents. Organizational value systems provide strong evidence for the existence of organizational agents. (Krogh and Roos, 1995; Kuhn, 1996).

According to Ranjan and Khalil (2007) selecting knowledge management technologies is often a daunting and risky task. Without an independent frame of reference, attempts to compare knowledge management technologies can be very confusing and fail to drive needed decisions. By providing a means to differentiate technologies according to their impacts on agents, artifacts and behaviors, the characterization framework described in this paper provides just the kind of neutral reference point organizations often need. By using the same framework to relate technologies, methods and practices back to targeted knowledge flows and their associated behavioral goals, it becomes easier to balance technical and non-technical approaches. This allows project teams to take a more rational, whole systems approach to development and deployment, improving their ability to develop tools and approaches that target and resolve

root problems and not just symptoms, improve organizational performance and lower overall life cycle risks.

2.6 Challenges in sharing knowledge

While the field of knowledge management has long been studied by scholars of several disciplines, there remain significant challenges. These challenges manifest themselves in practice and application (Dierkes, Berthoin, Antal, Child and Nonaka, 2003). According to Reinhardt, Bornemann, Pawlowsky and Schneider (2003), the concept of knowledge management and the degree to which its value is outpacing the tangible assets of companies has become an issue of concern for many organizations and managers. In a world replete with knowledge and information (often similar in meaning), or its possible acquisition, what is often missing within organizations are the processes for dissemination Dierkes, Antal, Child, and Nonaka (2003). As with most things, knowledge is only as good as its contextual applicability. Once knowledge/information has been determined to be useful, and applicable to a particular context, its manageability must be determined in terms of how it should be dispensed, who should be the recipients, what effects it will have on an organization and even the market in general.

One significant challenge of knowledge management is synthesizing the information processing technologies in the organization. People display unique abilities that allow the organization to survive and thrive on knowledge. According to Bellinger (2004), the value of knowledge management relates directly to the effectiveness with which the managed knowledge enables the members of the organization to deal with today's

situations and effectively envision and create their future. Hence, the challenge resides in building a culture that values face-to-face human relationships, reflection, and sharing.

The second challenge is of the individual versus the team in knowledge sharing as a consequence of the culture and context in which it resides. Grant (1996) cites the major challenge of knowledge management as the process of capture and integration. In order to be successful, an organization must first concentrate on changing the mindset of its followers. The goal in using knowledge management is to aid them in the performance of their duties.

The third challenge lies in the cultural dimension of organisations where Knowledge Management is applied. The tools, databases, and technological aids are not themselves Knowledge Management (Dierkes, Antal, Child, and Nonaka, 2003). Knowledge and learning come from people and their relationships with each other and their experiences. The real challenge for organisations is in developing organisational cultures that embrace learning, sharing, changing, and improving, all through the collective intelligence and knowledge of people (Kluge *et al.,* 2001).

According to Goldsmith *et al.,* (2004), one of the greatest challenges of knowledge management is the assurance that knowledge will prevail by ensuring that knowledge workers are given shared leadership. Goldsmith *et al.,* (2004) purports that both the follower and leader share a common purpose and that the loyalty of each is to the purpose and to helping each other stay true to that purpose (Chaleff, 2003, p. 17) – something that can only be done holistically, by giving knowledge workers a voice within the organization.

2.7 Theoretical considerations

2.7.1 Theories of knowledge management

This section outlines the various theories have been applied to study knowledge management.

2.7.1.1 Knowledge Management Theory

This theory defines the nature of knowledge as either explicit or implicit. Explicit knowledge is that which is formalizable and objectifiable in a scientific sense and whose content is typically captured in physical media. Knowledge that is explicit is often seen as an object—nuggets to be captured, stored, distributed, and retrieved. In this sense, managing explicit knowledge is not very different from managing data (Spender, 2000). On the other hand, tacit knowledge is difficult to articulate and is found in the heads of people. This extends the domain of knowledge beyond reason and what can be objectified into intuition, emotion, judgment, and skilled action (Nonaka and Takeuchi, 1995). In contrast to explicit knowledge, tacit knowledge is often seen as a flow.

The flow aspect of knowledge is emphasized in Nonaka's "SECI" model (Nonaka and Takeuchi, 1995) in which knowledge is said to be created through a repeating (spiral) interaction between tacit and explicit in four phases as shown in Table 2.1.

Table 2.1 Summary of the SECI model.

Interaction mode	Conversion process	Process example
Socialization	Tacit to tacit	Social interaction and shared understanding
Externalization	Tacit to explicit	Introspection leading to formal expression of ideas
Combination	Explicit to explicit	Analysis and synthesis of written information or data
Internalization	Explicit to tacit	Understanding written information or discussion

2.7.1.2 Communities of Practice

The term 'Communities of Practice' was first used by theorists Jeanne Lave and Etienne Wenger in 1991 who discussed the notion of legitimate peripheral participation (Wenger, 1996). In 1998, Etienne Wenger extended the concept and applied it to other domains, such as organizations. With the flourishing of online communities on the internet, as well as the increasing need for knowledge management, there has been much more interest in communities of

practice. People see them as ways of promoting innovation, developing social capital, facilitating and spreading knowledge within a group.

The communities of practice theory was pioneered by the Institute for Research on Learning, a spin-off of the Xerox Corporation in Palo Alto, California (Brown and Gray, 1995). The Institute pursues a cross-disciplinary approach to learning research, involving cognitive scientists, organizational anthropologists, and traditional educators. Communities of practice theory is based on the following assumptions:

- *Learning is fundamentally a social phenomenon.* People organize their learning around the social communities to which they belong.

- *Knowledge is integrated in the life of communities that share values, beliefs, languages, and ways of doing things.* These are called communities of practice. Real knowledge is integrated in the doing, social relations, and expertise of these communities.

- *The processes of learning and membership in a community of practice are inseparable.* Because learning is intertwined with community membership, it is what lets us belong to and adjust our status in the group. As we change our learning, our identity–and our relationship to the group–changes.

- *Knowledge is inseparable from practice.* It is not possible to know without doing. By doing, we learn.

- *Empowerment – or the ability to contribute to a community – creates the potential for learning.* Circumstances in which we engage in real action that has consequences for both us and our community create the most powerful learning environments.

According to Winkelen (2000), a community of practice is a group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. He further adds that communities of practice are formed by groups of people who come together to learn from one another face-to-face and virtually. Communities of practice are being used to create a learning culture in organizations by promoting what has come to be known as organizational learning. Organizational learning is the process by which organizations acquire tacit knowledge and experience (Geisler and Wickramasinghe, 2009). Such knowledge is unlikely to be available in codified form, so it cannot be acquired by formal education and training. Instead it requires a continuous cycle of discovery, dissemination, and the emergence of shared understandings. Successful organizations are giving priority to the need to build a "learning capacity" within the institution. Research institutions that are able to integrate a 'learning capacity' within their operations are bound to benefit greatly.

2.7.1.3 Social Learning Theory

Psychologist Albert Bandura proposed the theory in 1977. It explains human behavior in terms of a continuous reciprocal interaction between cognitive, behavioural and environmental determinants. Learning takes place both as a result of experienced responses, that is, operant view of learning, and vicariously through observing the effects on the social environment of other people's behavior. In explaining his theory of modeling, Bandura (1969, 1977) considers four distinct components or sub-processes: attention, retention, motor reproduction, and motivational processes. These processes

explain the acquisition and maintenance of observational learning or modeling (Luthans and Davis 1980).

2.7.1.4 Social Exchange Theory

The Social Exchange Theory (SET) was introduced in 1958 by the sociologist George Homans with the publication of his work "Social Behavior as Exchange." He defined social exchange as the exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two persons (Homans, 1961).

The theory posits that goal oriented human behavior is directed by the goal of profits, where profits consist of rewards minus the cost of invested behavior. The reward can either be material (economic) or symbolic (attention, advice, status). When the reward is received often, it no longer has value (diminished marginal utility), while scarcity increases the value of the reward.

The SET theory will be used as the theoretical framework to study knowledge sharing behavior of researchers at KARI. This is because it provides a suitable theoretical framework that will help assess the knowledge sharing experience at KARI.

According to SET possessing a skill that is scarce or highly coveted gives an individual power, and the person least interested in the reward has the most power (principle of the least). According to SET, individuals interact with others based on a self-interested analysis of the costs and benefits, as below:

- Maximize their benefits and minimize their costs.
- These benefits need not be tangible.

- People help others with an expectation of future return.

Several factors that have been used in existing literature for studying the social exchange theory include:

a) *Individual cognition*

- *Organizational commitment:* which is the level and type of psychological attachment an employee has with an organization."(O'Reilly and Chatman, 1986). One's commitment may encourage him or her to share knowledge due to a sense of responsibility to help others within that collective. Prior research provides evidence that organizational commitment is a strong determinant of individual knowledge sharing (Cabrera et al., 2006)

- *Perceived benefits:* defined as "the individuals' subjective perception of gain from their behaviors." (Forsythe et al, 2006). An individual can benefit from active participation in a social group. Some people may expect that their contributions will help them build a good reputation and improve their status within their social group.

b) *Interpersonal interaction*

- *Social interaction*: is defined as the strength of the relationships, the amount of time spent, and the frequency of communication among members. It may lead to a series of exchanges between parties and also provides an opportunity to combine and exchange knowledge.

- *Trust:* It is a set of specific beliefs primarily pertaining to the integrity, benevolence, and ability of another party (Chiu et al., 2006). When

trust exists between two parties, they are more willing to engage in cooperative interaction. It also creates and maintains exchange relationships, which in turn may lead to the sharing of good quality knowledge.

c) *Organizational context factors*

- *Organizational support:* It is the general perception that an organization cares for the well-being of its employees and values their contributions (Eisenberger et al., 1998). The relationship between employees and their employer is built on the trade of effort and loyalty for benefits such as pay, support, and recognition. Organizational support, direct or indirect, is an essential factor in the theory.

- *Reward systems:* These are the incentives provided by an organization to its members for shaping their behaviors (Cabrera and Bonache, 1999) or driving employees' performance (Lee and Kim, 2001). They are typically based on performance and can motivate employees. Explicit/hard rewards that organizations provide to motivate employees to share knowledge are popular.

In this regard therefore, social exchange is happening in an organizational context, which is by and large a highly competitive environment. Employees as individuals or as groups and teams or departments are competing over resources but on the other hand they have to cooperate in order to attain common goals. In such a situation, knowledge sharing is a part of the exchange process and knowledge is a very important source of exchange. The

transfer of knowledge in an organization has an exchange background although precise calculation and selections are not emphasized.

In general social exchange takes place under specific conditions over which members want to hold control. People enter into relations with others to get resources, which are under control of the others. In the process of social exchange employees exchange different resources: material resources and symbolic resources such as information, knowledge, power, respect, belongingness, sanctions, honor, emotions, etc. (Etzioni, 1968).

Figure 2.1 Conceptual Framework

The conceptual framework below indicates the relationships that exist between the variables for this study. These are indicated in an input- process- output relationship.

INPUT   **PROCESS**   **OUTPUT**

KNOWLEDGE TYPES

- Explicit

- Tacit

Individual cognition
Organizational commitment
Perceived benefits

Interpersonal factors
Social interaction
Trust

Organizational context factors
Organizational support
Reward system
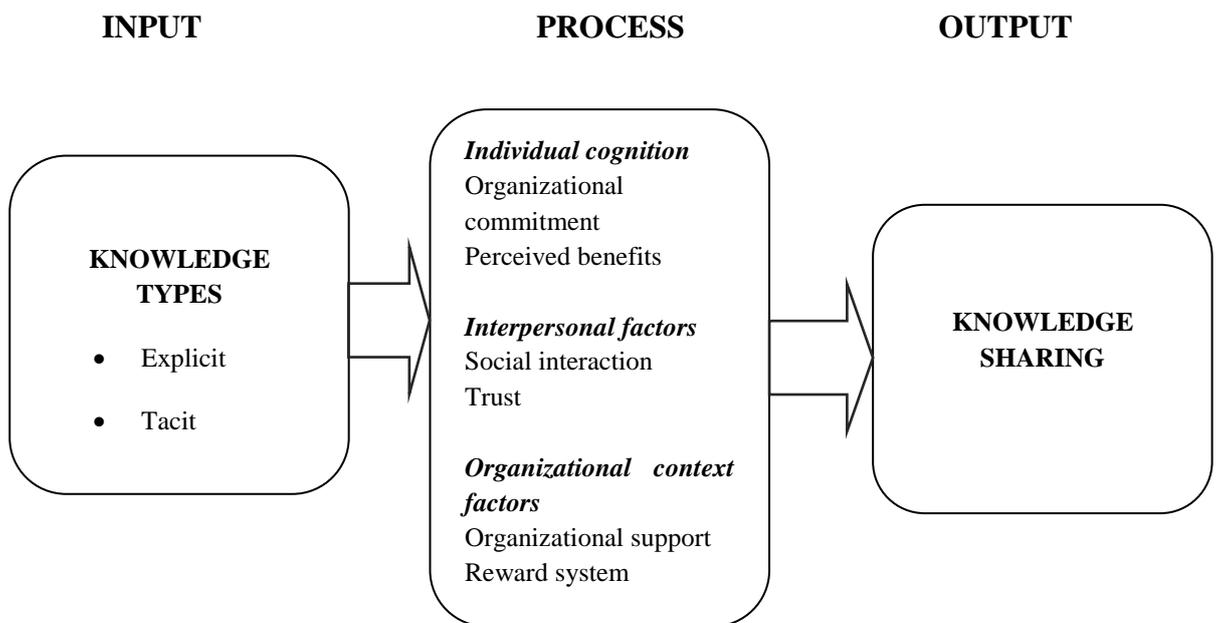
KNOWLEDGE SHARING

Source: Author (2014)

Since the study sought to establish the knowledge sharing practices at KARI, knowledge sharing became the output sought from the institution. The input constituted the various forms of knowledge generated within the organisation that include traditional/indigenous knowledge and new knowledge. For knowledge sharing to be achieved, these forms of knowledge need to be exposed through various socialisation modes such as socialisation (social interaction and shared understanding); externalisation (introspection leading to formal expression of ideas; combination (analysis and synthesis of written information or data); and internalisation (understanding written information or discussion).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the procedures that was used in accomplishing this study. It focuses on the research design, area of study, population, sampling procedures, data collection methods and instruments, operational definitions of variables, and data presentation and analysis.

3.2 Research design

This study was a descriptive survey research. It falls within the Phenomenological paradigm. Descriptive study design develops an understanding of a subject's or subjects' "reality" however he, she, or they so perceive (Leedy, 1997, p. 161). In essence, this approach investigates an individual's or group's perception of reality as he or she constructs it. These realities may be expressed as an event, program, relationship, emotion, etc. This study examined the relationship between experts in the context of knowledge sharing and examines the realities of the processes involved, both institutional and personal in the management and sharing of knowledge at KARI. Consequently, the study identifies and describes these processes as it finds them occurring at the project site.

3.3 Kenya Agricultural Research Institute

The Kenya Agricultural Research Institute (KARI) is a parastatal established in 1979 through the Science and Technology (Amendment) Act to carry out research on livestock, crops, soil and water resources. Its mission is to develop

and disseminate appropriate agricultural technologies and information in collaboration with stakeholders. KARI further contributes to the sustainable improvement in the livelihoods of Kenyans by increasing agricultural productivity, product development, and conserving the environment. In pursuit of its mission, KARI proactively seeks to acquire and contribute knowledge and creative solutions that are participatory and client-oriented; holistic and system-oriented; gender-sensitive and affordable to its stakeholders. It has 15* main research centres and 11 sub-centres located throughout the country. These centres are strategically placed to cater for different agro-ecological zones and socio-economic systems. The centres are found in Nairobi (headquarters), Embu, Garissa, Kakamega, Alupe, Katumani, Kiboko, Buchuma, Kibos, Kisii, Trans-Mara, Kitale, Lanet, Marsabit, Molo, Mtwapa, Mariakani, Matuga, Msabaha, Muguga, North Muguga, South Muguga, Mwea, Naivasha, Ol Joro Orok, Kabete (National Agriculture Research Laboratories), Njoro, Perkerra, Thika, Tigoni and Njambini (www.kari.or.ke).

KARI manages 15 centres inclusive of the sub-centres located all over the country with a view of developing and disseminating technology, tailored to meet the needs of different categories of farmers. The research institute has six main divisions, namely: crops, livestock, natural resource management, biotechnology and genetic resource management, socio-economics and applied statistics; and adaptive research, outreach and partnerships. It has several research programmes including animal health; animal production; food crops; biotechnology; horticultural and industrial crops; natural resource management; range research; regional adaptive research; social-economics

and biometrics; and seed research. The institute employs about 3,000 staff out of which 553 are research scientists (www.kari.or.ke).

Vision wise, KARI seeks to be an institute of excellence in agricultural research and technology transfer, contributing to an improved quality of life for all Kenyans. Its core functions include:

1. Collaboration with other organisations and institutions of higher learning in training programmes and on matters of relevance to research and technology transfer.

2. Liaison with other research bodies within and outside Kenya carrying out similar functions.

3. Dissemination of research findings and catalyzing adoption of suitable technologies

4. Cooperation with the agricultural sector ministries, the National Council of Science and Technology and relevant research committees in matters pertaining to agricultural research policies and priorities

5. Supporting its parent ministry through provision of research products and catalyzing their use for enhanced agricultural productivity

6. Carrying out research in agricultural and veterinary sciences

3.4 Study population

The study population for this study was drawn based on the data obtained from the Kenya Agricultural Research Institute in Nairobi. The institute campus constitutes the headquarters of KARI and houses all the administrative and central research units.

3.5 Study sample and sampling procedure

This study used purposive sampling to identify its sample. Purposive sampling was necessitated by the desire to capture the activities of a specific research chain so that the aspects of knowledge sharing can be traced in a systematic manner. According to Kerlinger (2003), purposive sampling is characterized by the use of judgment and deliberate effort to obtain a representative sample while reducing error and increasing possibilities in analysis. Purposive sampling is useful in qualitative research design and especially in cases where the data illustrates characteristics of particular subgroups of interest and also facilitates comparison, and the investigator relies on his or her expert judgment to select units that are representative or typical of the population (Patton, 1990). The sampling frame is presented below:

Table 3.1: Sampling frame for the study.

Category of population	Total number of crop researchers	Study sample	Percentage
Researchers	150	80	53

The researchers were selected from Kabete, Muguga South, Tigoni, Headquaters, Thika and Embu centres. The frame above shows that 53 % of the researchers in the study population were used in the study. The number is also adequate to mitigate against sampling error, and to have a higher confidence level in the estimate. Furthermore, the 53% is above the standard

required by various researchers (e.g., Ary, Jacobs and Razavieh, 1972; Remenyi et al., 2003).

3.6 Data collection

Data for this study was collected from multiple sources including self administered questionnaires, interviews with heads of departments and individual researchers, field notes from observations, and policy statements from the organisation. Data were triangulated among participants, observations, and document review to assure credibility. Respondents who were interviewed were asked to review a summary of the final results of the inquiry in order to confirm the credibility of the information.

3.6.1 Data collection instruments

3. 6.1.1 Questionnaire

According to Kombo and Tromp (2006), a questionnaire is a research instrument that gathers data over a large sample. It can reach a large number of subjects who are able to read and write independently. A questionnaire enhances anonymity of respondents and uniformity of questions, thus, allowing comparability. The use of closed ended questionnaires will be easier to analyze, administer, and economical in terms of time and money (Mugenda and Mugenda, 2003). This study used questionnaires. The questionnaire was a self-administered instrument with a set of questions seeking bio data and opinions on how the researchers dealt with knowledge sharing in the institution.

3.6.1.2 In-depth interviews

According to Chandran (2004), an interview is defined as the process of obtaining information directly from the respondent. It is an interactive process in which the interviewer initiates a discussion by asking questions. Its goal is to get the accurate and complete information from respondent. An in-depth interview is an open-ended, discovery-oriented method that is well suited for describing both program processes and outcomes from the perspective of the target audience or key stakeholder. The goal of the interview is to deeply explore the respondent's point of view, feelings and perspectives. In this sense, in-depth interviews yield information. The researcher prepared an interview guide with open-ended questions. The questions were semi structured to allow questions to flow from the conversation with respondents. The responses were recorded, typically with audiotape and written notes (i.e., field notes). The researcher also recorded his views and feelings immediately after the interview as well.

3.7 Ethical considerations

According to Mugenda & Mugenda (2003), a researcher has to be careful to avoid causing physical or psychological harm to respondents by asking embarrassing and irrelevant questions, threatening language or making respondents nervous. Similarly, Sommer and Sommer (1986) argue ethical considerations such as confidentiality, anonymity and avoidance of deception are very important issues in social research. For the purpose of this study, permission was first sought from relevant authorities and a letter granted to allow carrying out the research. Furthermore, the researcher consulted the respondents with a view to seeking permission to have the sessions recorded.

3.8 Data analysis and presentation

Data for this study were analyzed at two levels. The first level of analysis involved sieving of the recorded data to elicit the issues relating to knowledge sharing procedures that the respondents had been exposed to. This information was coded in terms of the variables of this study namely: autonomy, personal growth and positive relationships (Ryff, 1989; Ryff & Singer, 1998). The second level of analysis involves identifying the issues that were raised in the individual interviews and in the documentary analysis. The findings were then presented in tabular and graphic forms indicating the variables frequency and percentage in occurrence. This was followed by a detailed discussion of the findings.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Data presentation

The purpose of this study was to investigate the extent to which researchers at KARI share knowledge at the institute. In this chapter, the findings of the research are presented according to the study objectives and listing of items in the questionnaire and the interview guide. The data are presented in terms of frequency of occurrence of the response and the percentile. The presentation is done in tables and charts whenever applicable and a brief explanation is presented thereafter.

4.1.1 Questionnaire return rate

The sample population for this study was 90 researchers. All the respondents were issued with questionnaires while a select sample was exposed to the in-depth interview. Of the 90 questionnaires administered, 80 were returned and 10 were not (Table 4.1).

Table 4.1 Questionnaire return rate

Respondents	No. of questionnaires issued	No. returned	Percentage response
Researchers	90	80	89%

Based on the return rate shown above, we can conclude that the data was substantial for analysis since a very high percentage of the respondents were able to submit their responses to the researcher.

4.1.2 Characteristics of the crop researchers

The crop researchers were asked to indicate their age, gender, highest qualification and the departments where they were deployed. These details would provide credibility for the respondents and the data collected from them. Tables 4.2 to 4.5 show the distribution of the respondents according to their characteristics.

4.1.2.1 Age of the researchers

The respondents were asked to indicate their ages. This was necessary so as to understand the distribution of the respondents by age.

Table 4.2 Characteristics of crop researchers at KARI by age.

Age	Frequency	Percentage
21-30	1	**1**
31-40	21	**26**
41-50	35	**44**
51-60	22	**28**
Above 60	1	**1**
Total	**80**	**100**

Data in Table 4.2 indicates that the highest number (44%) of the researchers were between 41 and 50 years of age, 28% were between 51 and 60 years of

age, and 26% were between 31-40 years of age. Very few (1%) were between 21 and 30 years of age or above 60.

4.1.2.2 Gender of the researchers

The crop researchers were asked to indicate their gender. The purpose of this question was to find out whether there was gender balance. The findings indicate that a significant number (59%) of crop researchers were male while 41% were female. The findings suggest that agricultural research at KARI is male dominated. Despite this dominance, there are indications of a slight change when compared to a study done by Kiplang'at (2004) where male researchers at KARI were 64% and female were only 36%.

4.1.2.2 Highest level of education

The study sought to establish the characteristics of the respondents in terms of the highest level of education and the findings are presented in Table 4.3.

Table 4.3: Characteristics of crop researchers at KARI by education level

Education level	Frequency (n)	Percentage
College Diploma	17	**21**
Bachelor's Degree	12	**15**
Master's Degree	41	**51**
Doctorate Degree	10	**13**
Total	**80**	**100**

With regard to the respondents level of education, the study found that 41 (51%) of the researchers had Master's Degrees; 17 (21%) had College Diplomas; 12 (15%) had Bachelor's degrees, while 10 (12%) had attained Doctorate Degrees. These findings indicate that the crop researchers are highly qualified for their work as 63 % had Master's degrees and above in agricultural science such as crop science, crop pathology, horticulture and crop pathology among others.

4.1.2.2 Research departments

The study further sought to identify the various departments from which these respondents were drawn from. The findings in this regard are presented in Table 4.4 below.

Table 4.4 Characteristics of crop researchers at KARI by departments

Department	Percentage
Social Economics	**14**
Crop protection	**29**
Agronomy	**6**
Biochemistry	**11**
Horticulture	**16**
Postharvest management	**4**
Potato research	**5**
Oil crops	**2**
Natural resource management	**13**
Total	**100**

Results in Table 4.4 show the various departments of the respondents. The department of Crop Protection had the greatest number of respondents accounting for 29%. The other departments, that is, Horticulture, Social Economics, Natural Resource Management, and Biochemistry had 16%, 14%, 13% and 11% per department. The respondents from agronomy, potato research, postharvest, and oil crops departments totalled 17%. This spread of respondents provided a balanced coverage of the crop-related research departments in KARI and hence was able to provide adequate data for a balanced assessment of the knowledge sharing practices in the study site.

Social economics cuts across all research programmes at KARI. According to Kiplang'at (2004),

KARl manages a socio-economics research programme to provide socio-economic input in different programmes. This was after the realization that development, adaptation and adoption of appropriate agricultural technologies cannot be effective without considering socio-economic aspects of the farmers and other stakeholders. These include factors such as output/input prices, domestic and external input-output markets, profitability interventions, existing policies of facilitating institutions and socio-cultural issues (KARI 2002:43). Socio-economist researchers have, therefore, been deployed to all KARI research centres to manage the programme.

Natural resource management is also a cross-cutting department that looks at how various crops and the farm inputs used to grow them positively or negatively affect the environment.

The study also sought to find out whether the respondents were actively involved in research work and the results are shown in Table 4.5.

Table 4.5: Number of research projects each researcher was involved in

Research projects involved in	Frequency
1	16
2	31
3	19
4	10
5 and above	4
Total	**80**

The results show that majority of the researchers, 31 were involved in two projects, 19 researchers were involved in three projects, while 16 were working on one project. 10 researchers were working on four projects and only four of them were involved in five or more projects. The fact that 64 researchers were involved in more than one project points to the need for knowledge sharing among researchers, both inside and outside the research teams being more of a necessity than an option.

4.1.3 Do researchers at KARI share knowledge?

The study sought to establish whether researchers at KARI shared knowledge or not and their general perception of knowledge sharing at the institute.

First researchers were asked whether or not there was a formal or scheduled forum for sharing research findings or new knowledge. All the respondents

(100%) answered in the affirmative with majority of the respondents indicating they shared their research findings during KARI's biannual conferences. Others mentioned research team meetings, journal articles, annual reports, conferences, workshops, scientific meetings, advisory committees and mentorship sessions.

Secondly, the respondents were asked how frequent the formal knowledge sharing forums were and the findings are presented in Figure 4.1.
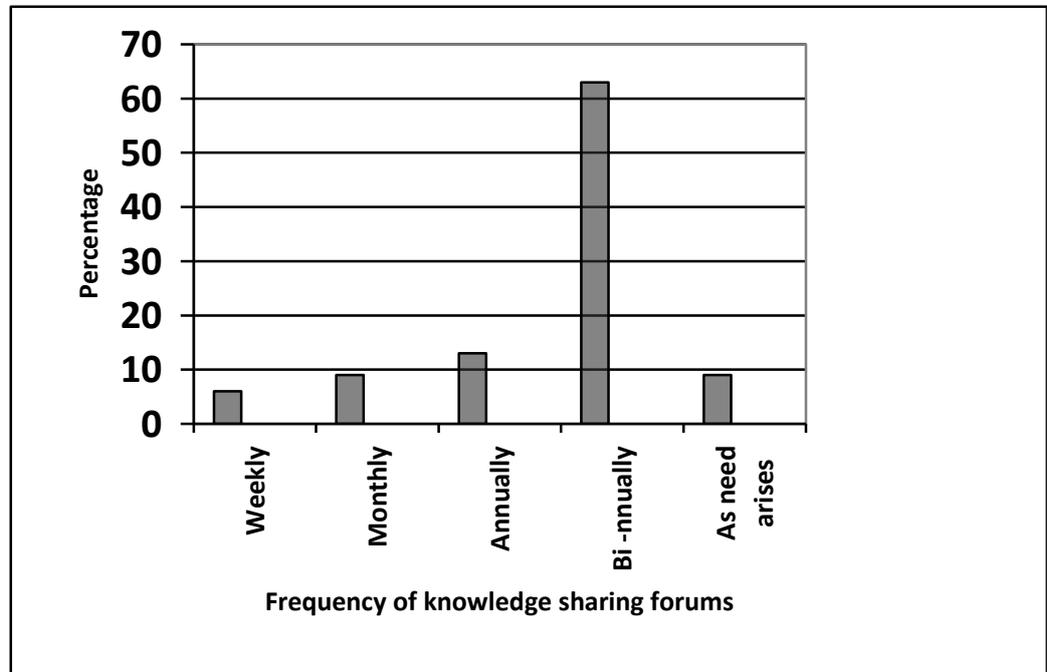
Figure 4.1 Frequency of formal knowledge sharing forums

The results presented in Figure 4.1 above indicate that forums for sharing knowledge were understood differently by the respondents. The findings show that the majority of respondents (63%) indicated that forums for sharing new knowledge were organised on biannually. Thirteen percent of the respondents indicated that such knowledge sharing forums were organised annually while

nine percent indicated that such knowledge sharing meetings/forums were held either monthly, or as the need arose. Six percent indicated that the formal forums were held weekly. This data raises a fundamental question about the institute's policy on such forums. It is unlikely that one institution can have different meeting policies with regard to sharing new knowledge. Perhaps the interpretation of such forums was not clear to the respondents or there exist different levels of knowledge sharing forums.

Attempt was also made to get views on how researchers perceived knowledge sharing. First, the study sought to establish whether sharing knowledge was a daily routine within the institute. The findings in this regard are presented in Figure 4.2.
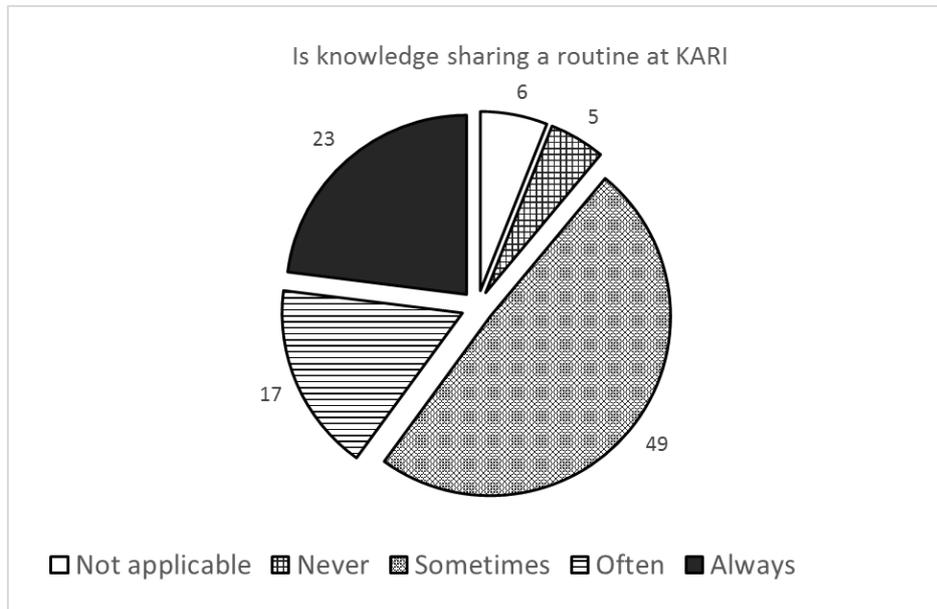

Figure 4.2: Frequency of daily knowledge sharing

The results show that 23% of the respondents indicated that knowledge sharing is always a routine exercise. Of the respondents, 17% indicated that

knowledge sharing was done often while another 49% indicated that knowledge sharing was done sometimes, with 5% and 6% indicating it was never done and not applicable respectively. These findings may be closely related to the earlier findings where majority of the respondents shared their research findings during the bi-annual conference and hence the reason 49% indicated that knowledge sharing was done sometimes. However it is curious that 11% of the respondents thought the question was either not applicable or answered they never shared knowledge. This disparity in responses creates some amount of curiosity about the actual state of affairs with regard to the process of knowledge sharing at KARI. It is difficult to visualise the absence of concurrence about whether or not there was a process of knowledge sharing in an institution where all the respondents work.

When asked whether knowledge sharing was an integral part of research at KARI, 83% of the researchers answered 'yes' while 17% gave a 'no' response. Considering that KARI is a research organization that regularly generates new knowledge, and one of their guiding core functions is effective information and knowledge management including sharing knowledge within and outside the institute (http://www.kari.org/node/1) it is unsettling when some researchers view knowledge sharing as a non-integral part of research.

Perhaps, the lack of a vibrant knowledge sharing practice among researchers could result from the small percentage that did not view knowledge sharing as an integral part of research. A knowledge management strategy for KARI may help address this issue because according to Osterloh et al. (2002), where there

is a strong and shared perception of the importance of internal knowledge sharing, intrinsic motivation will lead employees to go beyond the call of duty to share knowledge. The strong and shared perception can only be realised when there is a knowledge management strategy in place that emphasizes on the importance of sharing knowledge within the organization.

4.1.4 What methods do researchers use in knowledge sharing at KARI?

In view of the information gathered with regard to there being knowledge sharing at KARI, the study sought to establish the methods, both technology supported and non-technology supported, used to share knowledge at the institute. Results in Table 4.6 below show the frequency with which the various methods of knowledge sharing are used at KARI.

Table 4.6: Methods used to share knowledge at KARI.

Method	Not used (%)	Moderately used (%)	Frequently used (%)
Face-to-face	9	43	48
Discussions groups	28	51	21
After project review	18	35	47
Story-telling	77	16	7
Workshops	5	31	64
Seminars	2	37	61
Conferences	4	32	64
Email	15	62	23
Telephone conversation	23	59	18
Blog	87	12	1
Online discussion forum	75	21	4
Community of practice	56	28	16
Organization intranet	66	30	4

According to the results in Table 4.6, the most frequently used methods of knowledge sharing are workshops and conferences. Sixty four percent of the respondents indicated that they frequently used workshops and conferences to share information on their research findings. Respondents indicated that the workshops, conferences and seminars constituted formal and programmed forums for dissemination of research findings and offered a structured avenue for sharing new information. Consequently, the workshops and conferences had more reach in terms of accessing such new information not just to the internal publics but to external publics as well.

The next most popular methods of sharing knowledge were face-to-face and after-project review forums. The after-project reviews took place after every project engagement where researchers presented their findings based on a project that involved a coordinated investigation into a field of research. These forums not only confirmed or negated old knowledge but also shared new knowledge generated from the project undertaking. According to the results, 47% of the respondents indicated that they often used after-project reviews to share knowledge. Face-to-face sharing was frequently used by 48% of the respondents and often took place during informal sessions like over a lunch time meal or when a request for particular information was made.

Blogs, storytelling and online discussion forums constitute some of the least used methods for sharing knowledge at KARI, with 87%, 77% and 75% of the respondents indicating non-usage of the three methods respectively. This is perhaps borne from the fact that blogs and online discussion forums are newer methods of sharing knowledge that are just gaining popularity with the rise of social media. Story telling though a method that has existed over the years, has reported more usage in social sciences as opposed to scientific disciplines like agricultural research.

In the responses given on the use of the organisational intranet, 66% of the respondents indicated that they did not use it to share knowledge. The intranet, the in-house version of the web browser based on internet technology, creates a common corporate communications and information-sharing system (Brelade and Harman 2003). The organisational intranet provides perhaps one of the movement free ways of sharing knowledge especially for organizations

with offices in multiple geographic locations like KARI. Email and telephone conversations are mostly moderately used at 62% and 59% respectively.

According to Bajpai (2004) some people argue that technology is not a necessity in implementing a KM programme, and to some extent they are right. KM is fundamentally about people, not technology. But there is absolutely no way that knowledge can be effectively shared within an organization, whether small or large, without using technology. Information technology (IT) support can be classified into the use of a repository for storing and sharing knowledge (mostly linked to the intranet or internet) and the use of a communication medium for communicating and sharing knowledge among individuals.

In this study, the non-technology supported methods included were: face-to-face, discussion groups, after project review, storytelling, workshops, seminars and conferences, while the technology supported methods were: email, telephone conversation, online discussion forum, blogs, community of practice (COP) and intranet.

From the results in Table 4.6 it is evident that the crop researchers mostly use the non-technology supported knowledge sharing methods with workshops, seminars and conferences getting high ratings of over 60% followed by face-to-face and after project reviews at 48% and 47% respectively.

There have been diversified approaches in using information technology as a solution to promote and knowledge sharing (KS) in an organization. These approaches have strengths and weaknesses of their own with respect to

technological advances, user's reception, adaptability, and success rate in the actual sense of generating knowledge (Bajpai, 2004).

The only technology supported knowledge sharing methods that were rated moderately used by 62% and 59% of the respondents were email and telephone conversation respectively. This collaborates to a study by Kiplang'at (2004) where 96.2% of the agricultural researchers at KARI reported using information and communication technologies to communicate with fellow colleagues. In the study 75% and 58% of the agricultural researchers were of the view that email and telephone respectively, were effective end very effective in disseminating agricultural research information.

COPs, intranet, online discussion forums and blogs were rated 'not used' by 56%, 66%, 75% and 87% of the respondents respectively. It is important to note that the four methods are internet dependent. The findings show that researchers frequently use the methods that have existed for a relatively long time and only very few use the more recent methods like blogs and communities of practice. This may be due to user's reception or adaptability as stated by Bajpai, (2004).

The non-usage of COPs at KARI may need to be re-thought in the perspective of Morris, Snell, Lepak, (2005) who suggest that effective knowledge sharing mostly takes place within a community of practice that consists of people who share a common interest and are willing to learn from each other. Apparently, the respondents indicated that they did not use communities of practice as a forum for knowledge sharing yet they share a common interest - research.

Hence we can conclude that even though there exists knowledge sharing in KARI, there are no strategic processes to ensure effective and vibrant knowledge sharing practices.

4.2.5 What factors influence knowledge sharing at KARI?

Previous studies have reported factors related to the social exchange theory are successful in explaining knowledge-sharing behaviour among individuals. These factors include personal cognition, inter-personal interaction, and organizational contexts (Liang, Liu and Wu, 2008). In a research institution such as KARI, these factors come into play in so far as knowledge sharing is concerned. This study sought to establish how factors like perceived benefits, trust, organizational support, reward systems and intra-team knowledge sharing influenced knowledge sharing at the institution.

4.2.5.1 Perceived benefits

In order to understand how researchers felt and they benefited from knowledge sharing, the respondents were asked several questions. First, the respondents were asked whether they felt like they benefitted when they shared knowledge and all them (100%) gave a positive response. Secondly, the researchers were asked whether they benefit from the knowledge shared by other researchers and again all of them (100%) answered in affirmative. Thirdly, the researchers were asked to give examples of how knowledge shared by other researchers was beneficial to them, and the responses are summarized in Table 4.7.

Table 4.7: Examples of how knowledge sharing has been beneficial to researchers

Response	Frequency (n=57)
The knowledge helped improve the quality of my research work such as: define the scope of my study well, understand data analysis, improve weak areas in the research project.	44
The knowledge helped to solve some research challenges like emerging crop diseases encountered in the course of research work	8
Personal development where experiences shared by other researchers helped build my confidence when sharing research findings	5

The responses in Table 4.7 show that most researchers (77%) were able to improve their research work from knowledge shared by their counterparts. Only 13% were able to solve some of the challenges they encountered in the course of research from knowledge shared by their colleagues, while 9% realized personal development benefits.

Fourthly, when the researchers were asked whether new knowledge empowered them, all of them (100%) gave a positive response. They were then asked whether they recognized knowledge as a key resource for research work and 72% responded that they always recognize knowledge as a key

resource, while 15%, 9% and 4% gave answers of 'often,' 'sometimes' and 'not applicable' respectively.

Finally, the researchers were asked what motivated them to share knowledge with other researchers and their responses are captured in table 4.8 below.

Table 4.8: Factors that motivate researchers to share knowledge.

Motivating Factor	Frequency	Percentage
To avoid repetition of research	9	12
For advice	58	76
To increase the multiplier effect of technologies	9	12

The results in Table 4.8 indicate the responses given with regard to the motivating factors that influence researchers to share knowledge. According to the results, researchers share knowledge so that they can seek advice from their peers on the findings and any other new knowledge they may have obtained through research. Those who gave this as a motivation for knowledge sharing were 88% of the respondents. Fourteen percent indicated that they shared knowledge in order to avoid duplication of research while another 14% indicated that they shared knowledge with fellow researchers because they intended to increase the multiplier effect of technologies used or adopted.

4.2.5.2 Trust

The study also sought to find out how trust influenced knowledge sharing among crop researchers at KARI. Respondents were asked whether trust

52

determined who they shared knowledge with among fellow researchers and 90% of them gave a positive response while 10% gave a negative response. In the social exchange theory, Blau (1964) states that trust is essential for the social exchange process. Trust creates and maintains exchange relationships, which in turn may lead to the sharing of good quality knowledge.

For further clarification, the study sought to know whether there were certain things that made researchers more comfortable sharing knowledge with researchers who were close friends as opposed to those who were not close friends. The responses are presented in figure 4.4 below.
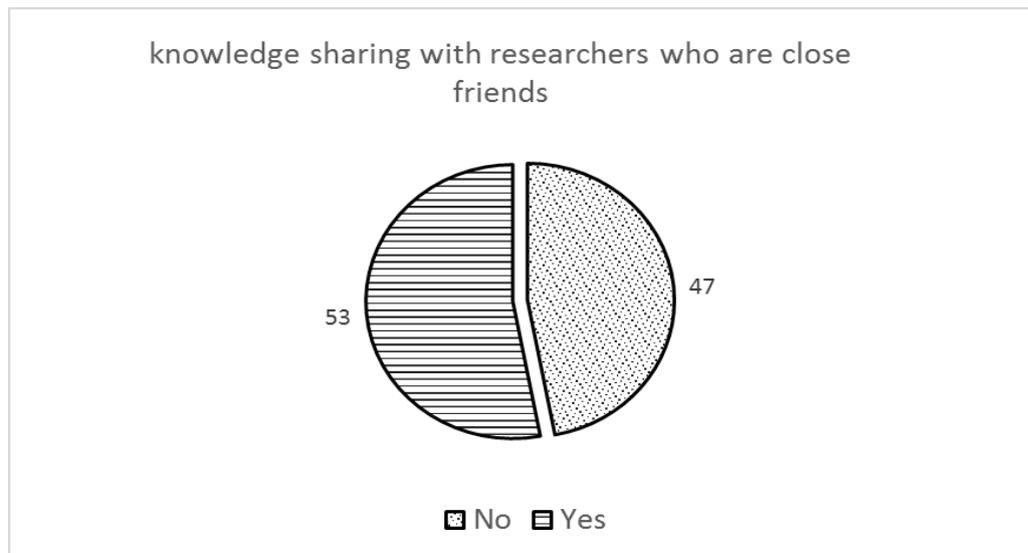

Figure 4.4: Knowledge sharing with researchers who are close friends

As shown in figure 4.4, 53% of the respondents indicated 'yes' and 47% indicated 'no.'

Since intra-team knowledge sharing was also a factor of concern, the study sought to find out whether the researchers that were considered close friends were in the same research team as the respondent and 51% of the respondents answered in affirmative while 49% gave a negative answer. If 53% of the respondents share knowledge with fellow researchers who are close friends and 51% of the respondents indicated that these close friends were in the same research unit, then it may be correct to conclude that to a certain extent, social interactions influence knowledge sharing behaviour among crop researchers at KARI. By virtual of their work, researchers in the same research team may be forced to interact more as they work towards achieving a common agenda. This concurs with the findings of Chui *et al.,* 2006, who found empirical support for the influence of social interaction on individual's knowledge sharing and added that social interaction provides the opportunity to combine and exchange knowledge. This finding is also in tandem with the findings of Tsai, (2002) where the level of interaction between members of different groups or units has a significant positive effect on the level of knowledge sharing among them. Bjorkman et al. (2007) adds that previous research has indicated that socialization mechanisms that develop trust and cooperation among individuals and facilitate formal and informal face-to-face relationships positively affect knowledge sharing.

Reciprocity has also been closely associated with trust whenever the SET is used to study knowledge sharing behaviour. In view of this, the respondents were asked whether the researchers who were close friends also reciprocated

by sharing knowledge with them and 84% gave a positive response while 16% gave a negative response.

4.2.5.3 Organizational support

The social exchange perspective assumes that the relationship between employees and their employer is built on the trade of effort and loyalty for benefits such as pay, support, and recognition (van Knippenberg and Sleebos, 2006). To this end, the study sought to find out if knowledge sharing among researchers was actively promoted at KARI. Thirty three percent of the respondents were of the opinion that knowledge sharing is 'sometimes' actively promoted, while 26% thought it was often promoted. Twenty one percent of the respondents indicated knowledge sharing among researchers was 'always' actively promoted, 12% thought it was never promoted while 8% did not provide a response.

Next, the respondents were asked whether there were any incentives put in place to encourage knowledge sharing among researchers at KARI and the results are presented in figure 4.5.
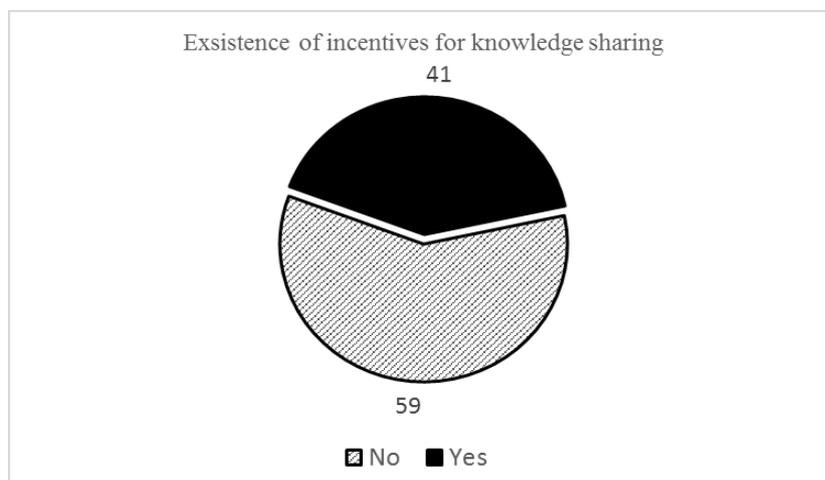
Figure 4.5: Existence of incentives for knowledge sharing

As shown in figure 4.5, 59% of the respondents gave a positive answer while 41% gave a negative answer. In addition, the respondents were asked to list the incentives and these were: awards for the best presentation during conferences, awards for the best project of the year, certificates, trophies, monetary gifts and promotion based on papers presented in conferences/journals/workshops.

The aspect of rewards is crucial in such an organisation where individual effort is required in producing new knowledge. The study found that researchers were sometimes rewarded for sharing knowledge. Collectively taken, the majority of respondents felt that the researchers were not rewarded well for sharing knowledge at the institution. The notion of motivation is crucial in enhancing knowledge sharing. Minbeava, (2005) asserts that the incentive system includes performance-based compensation and the use of internal promotion systems that focus on employee merit and help employees to overcome invisible barriers to their career growth. Promoting employees from within the firm is likely to provide a strong motivation for employees to work harder in order to be promoted.

It was also important to find out if top management at KARI recognized knowledge management (which includes knowledge sharing) as an important part of the organization strategy. The results are captured in Table 4.9.

Table 4.9: Knowledge management an important part of the organizational strategy at KARI

Rating	Percentage
Not applicable	6
Never	8
Sometimes	32
Often	14
Always	40

This may be influenced by the fact that there is no knowledge sharing strategy hence the varieties of interpretation. According to Leibold *et al.,* (2007), the most important critical success factor in making knowledge sharing happen is the unconditional support of top management. This seems to be lacking at KARI. Leibold adds that top management support enhances the value and strategic quality of the knowledge management initiative and sends a signal to channel organizational resources and individual commitment towards knowledge sharing.

4.2.5.4 Intra-team knowledge sharing

In KARI, research projects are done by research teams of five to ten researchers depending on the scope of the project. The study sought to establish whether or not, in the current research teams, there existed good intra-team sharing of knowledge. The results are presented in Figure 4.6.
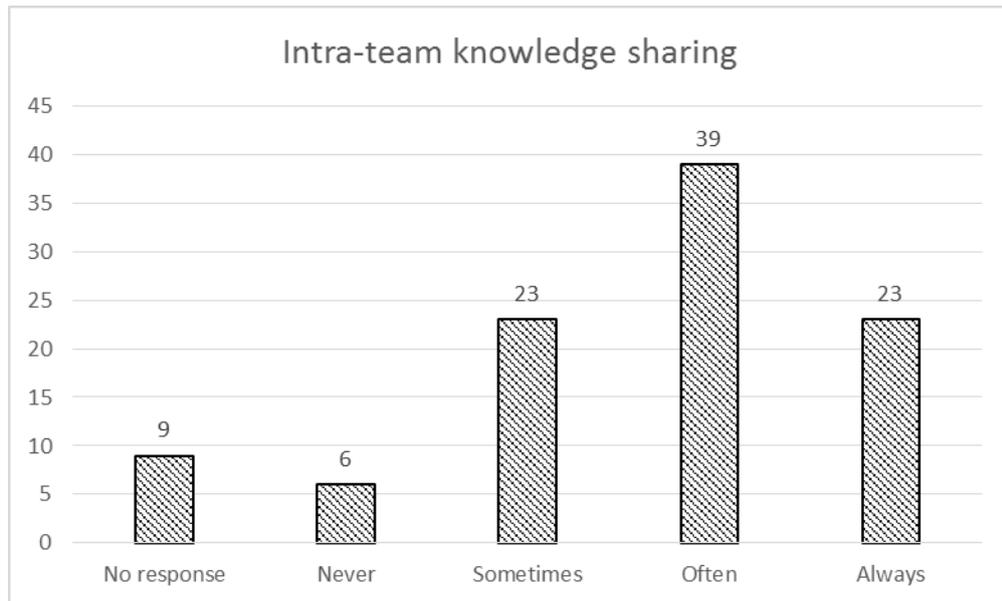
Figure 4.6: Intra-team knowledge sharing

According to the results in figure 4.6, 39% of the respondents indicated that there was often good sharing of knowledge, 23% indicated that knowledge sharing in a research team took place sometimes and an equal number of respondents indicated it took place always. 6% indicated that there was no sharing of knowledge in research teams while 9% provided no comment. This poses a problem in the sense that it is perhaps difficult to perceive a research group that does not share knowledge between its members.

Further, the study sought to establish whether there was cooperation in research teams when it came to knowledge sharing. 93% of the crop researchers responded positively while 7% gave a negative response. When asked the reasons for the positive response, the answers given were: research work is based on teamwork, research teams work towards the same goal, teams discuss and agree on project implementation, members of research

teams consult each other freely whenever need arises, most team members are helpful and ready to add value to new knowledge, knowledge sharing is a key component when recruiting team members into a research project, researchers also mentor one another, teams understand the roles of each member in the project, members of the research team are competent, easy to work with and always ready to share knowledge with other team members.

The reasons for cooperation in research teams provided by the researchers concur with the views of Cumming (2004) who contends that knowledge sharing within a group is usually more interactive because it creates an opportunity for group member to share and receive knowledge from others either directly or indirectly.

The reasons given for the negative responses were: some researchers hoard information, while others seem too busy. This phenomenon has been explained by Wittenbaum (1998) who states that some individuals in a group may regard other members in a competitive way and therefore tend to hoard their uniquely possessed knowledge. Dravenport and Prusak (1998) add that such individuals may look guardedly at knowledge offered by others and be unwilling to share what they know.

The percentage of respondents who gave a negative response on cooperation in research teams and those who felt there was no intra-team sharing of knowledge in research teams were 7% and 6% respectively. This could be

attributed to different levels of cohesiveness in research teams which in turn leads to knowledge hoarding.

4.2.6 Challenges researchers encounter in the process of knowledge sharing

This study also sought to establish what challenges the researchers at KARI experienced in the process of knowledge sharing at the institution. Given that knowledge sharing involves individuals with different motivating factors, the likelihood of personal and institutional challenges cannot be underestimated. Consequently, the study sought to know from the respondents whether or not there were issues that made them get discouraged or prevented them from sharing knowledge. The findings in this regard are shown in figure 4.7.
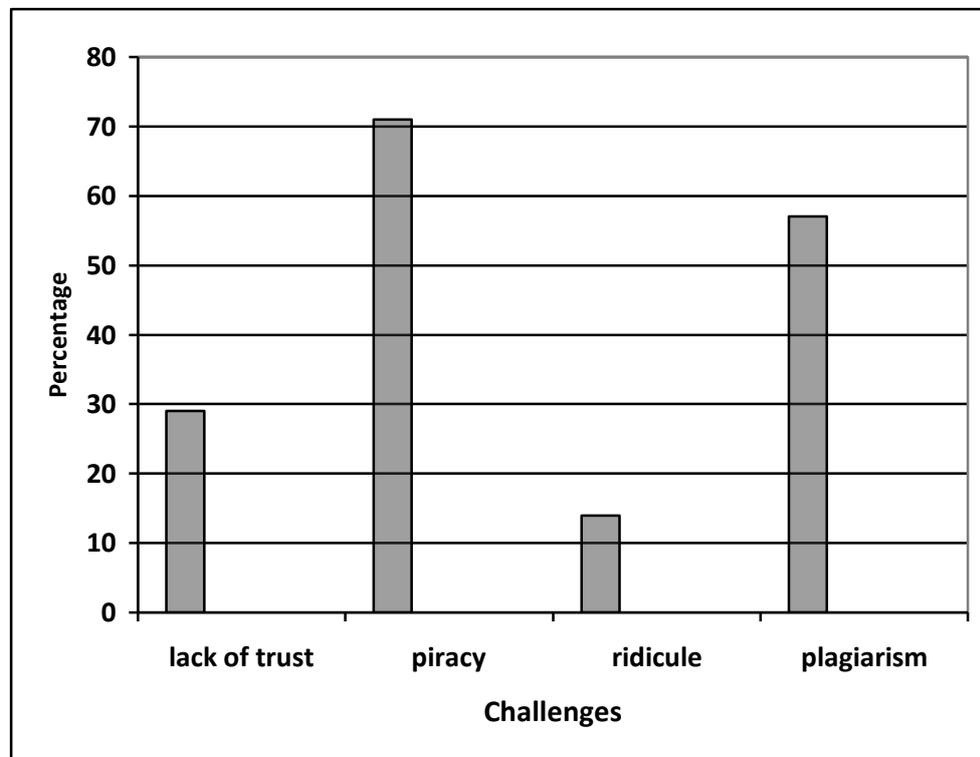

Figure 4.7: Challenges to sharing knowledge with fellow researchers

Figure 4.7 shows the responses with regard to the challenges encountered by researchers and which emanate from fellow researchers. Piracy constitutes the highest challenge with 71% of the respondents indicating that they feared piracy of findings from fellow researchers when they shared new knowledge. Fifty seven percent indicated that plagiarism constituted a real challenge from fellow researchers. This led to lack of trust of fellow researchers, a fact that was mentioned by 29% of the respondents. Fourteen percent indicated that they feared ridicule and so it posed a challenge to them. These findings are similar to what Szulanski (2003) states 'People on the source side may be reluctant to share their knowledge with others for fear of losing ownership, a position of privilege, superiority or insufficient rewards'

4.2.7 How can knowledge sharing among agricultural researchers be enhanced?

Finally, the study sought to find out what the researchers at KARI can do to enhance knowledge sharing among themselves. The findings in this regard are presented in Table 4.10.

Table4.10: Suggestions on how to improve knowledge sharing at KARI

Suggestion	Percentage*
More formal and informal knowledge sharing forums at various levels; research teams, departments, research centres and the entire institute.	88

Table 4.10: Suggestions for improving knowledge sharing at KARI

More incentives and rewards for knowledge sharing such as recognition, promotion and awards	71
Enhancing trust among researchers especially by addressing the challenges of piracy and plagiarism	80
Improving communication/interaction channels	43
Institutionalizing teamwork so that it does not depend on the initiative of individual researchers	14
Encouraging and facilitating researchers to attend formal forums for sharing knowledge outside their research centres.	14

*the percentage shows multiple responses

Table 4.10 shows the suggestions that researchers made with regard to enhancing knowledge sharing within KARI. Seventy one percent of the respondents suggested the opening up of stakeholder meetings to all interested scientists; 43% suggested the encouragement of interaction among the

scientists and the assignment of duties according to areas of expertise; 88% indicated that setting up of quarterly workshops and seminars would increase knowledge sharing among scientists. Twenty nine percent suggested the building of confidence in lower cadres of researchers to encourage more research and sharing of findings. Fourteen percent suggested the establishment of a fair and just reward system to encourage researchers to share knowledge.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Following the discussion of the findings discussed in chapter four above, the following conclusions can be made. Firstly, the study identified that knowledge sharing did exist at the KARI but to a limited extent. This limitation was found to arise from the limitation of forums for researchers to present their findings to other researchers. The study established that only one forum per year, the yearly seminar, is the formal forum for presentation of findings by researchers. The second limitation arises from the mode of communication available to researchers to use as an avenue for knowledge sharing. The study found that researchers use the traditional method of presentation of findings and are yet to embrace the modern methods of ICT communication such as e-mail, blogs and the intranet to provide them with mediums of communication of findings. As a result, very little is shared between them as they wait for the formal fora.

Secondly, the study found that knowledge sharing with stakeholders of the institute was rather limited because of inherent fears by researchers of plagiarisation. The study found that researchers were reluctant to share their findings especially with fellow researchers for fear that others would copy their work. However, the study found that researchers shared their findings with farmers and extension officers with a view to confirming their findings and for up-scaling their research findings.

Thirdly, the study found that the researchers in KARI are not well motivated to share the knowledge they generate through research. This motivation refers to extrinsic rewards that are given in appreciation of research findings. As such, most researchers are hesitant to provide access to their findings from research to colleagues.

5.2 Recommendations

Based on the conclusions made in 5.1 above, various recommendations can be made regarding knowledge sharing at KARI.

There is need to establish a knowledge management policy and a knowledge sharing strategy for KARI. This is borne out of the fact that despite there being official forums for sharing research findings, no avenues have been specifically designed to allow researchers to interact at the level of knowledge sharing, whether through formal or informal channels.

There is need to embrace new technologies in managing and sharing information between researchers at KARI. Computer mediated communication provides a more flexible means to share knowledge at a more interpersonal level therefore enhancing the exchange of ideas with regard to both new knowledge and old knowledge.

This study recommends that the necessary infrastructure needs to be put in place to enhance stakeholder participation in the creation, sharing and storage of knowledge in the KARI. These include the researchers the farmers and the extension officers who are the immediate consumers of new knowledge generated at the institute.

An extrinsic reward system needs to be enhanced to provide motivation to share knowledge. This may be in form of direct rewards or in generous research allowances that will bolster the inner desire to carry our research and share their findings.

There are various issues that have arisen in the course of this study that warrant further research which include:

- The knowledge sharing strategies employed by management in public research organisations

- How different knowledge sharing methods affect knowledge sharing in research organisations

These would help to capture the salient issues perhaps much better than this study has done.

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intellectual capital and organizational performance. Journal of Managerial
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APPENDIX 1

LETTER FROM KARI

KENYA AGRICULTURAL RESEARCH INSTITUTE
HEADQUARTERS:
P. O. BOX 57811 TEL: 4183301/20
FAX: 4183344
e-mail:resource.centre@kari.org
NAIROBI

When replying please quote:

Our Ref: **KARI/3/041/VOL. IX/**   DATE: 7th April, 2011

Ms. Esther Kahinga
C/O University of Nairobi
P.O. Box 30197 - 00100
NAIROBI

RE: REQUEST FOR PERMISSION TO CARRY OUT EDUCATIONAL RESEARCH AT
        KARI CENTRES

Reference is made to your letter requesting for permission to distribute your questionnaires to selected staff in selected KARI Centres in order to collect data for your Master of Science in Agricultural Information and Communication Management at the University of Nairobi.

This is to inform you that we have no objection to your administering your prepared data collection tools at KARI Centres namely: Muguga South, Muguga TRC, Muguga North, Kabete, Tigoni, Thika, Katumani, Mwea, Njoro, Naivasha, Lanet, Embu and Kiboko starting from 11th to 29th April, 2011, to enable you collect data for your project entitled: "Knowledge Sharing among Agricultural Researchers in Kenya". We also note that you intend to conduct telephone or face-to-face interviews with the heads of the following departments: Food Crops, Livestock and Range Management, Natural Resource Management, Biotechnology and Genetic Resource Management, Socio-Economics and Applied Statistics, Adaptive Research, Outreach and Partnership and Information Services.

It is noted that you will undertake to provide a copy of your final thesis to KARI Headquarters Library as we would be an interested party to your findings with regard to our participation.

By a copy of this letter, the randomly selected KARI staff are requested to assist in this process by completing the questionnaires you will provide to the.

Martin Kivui
Assistant Director, HRD
FOR: DIRECTOR – KARI

cc.   Centre Directors as above
        Divisional Heads as above

QUESTIONNAIRE

Dear respondents,

Re: Knowledge Sharing Among Agricultural Researchers in Kenya: A Case Study Of The Kenya Agricultural Research Institute (KARI)

The world is developing fast and today more countries are looking forward to knowledge economies as opposed to information economies. For knowledge economies to grow there is need to harness knowledge and devise ways and means of sharing the knowledge available so that we enrich our lives and careers, and thus avoid re-inventing the wheel.

Kenya has a rich agricultural history from pre-colonial times to modern day farming that is laden with challenges such as decreasing area of arable land, increase in population, increasing cost of production/farming, adverse weather condition exacerbated by climate change, issues related to biotechnology among others. KARI has been in the forefront of enhancing agricultural production in the country since 1979. The researchers at the institute, due to their interaction with farmers and other players in the agricultural sector, have over the years gathered profound knowledge, especially on indigenous agricultural practices.

The aim of the research is to assess the extent to which researchers at KARI share the knowledge they acquire in the field with their colleagues at the institute. This will go a long way in helping the institute and researchers to improve knowledge sharing within and without.

Thank you for your anticipated assistance.

Yours sincerely,

Esther Kahinga,
Student - Msc. Agricultural Information and Communication Management,
Department of Agricultural Economics,
University of Nairobi.

QUESTIONNAIRE

The questionnaire below is designed to collect data for a research study on the knowledge sharing practices at the Kenya Agricultural Research Institution (KARI). Please note that all information disclosed in this questionnaire remains confidential. It will take you (the respondent) about 20 minutes to complete the questionnaire.

Please complete the questionnaire by ticking the answer where choices are provided.

PART A: Bio data

1. Gender:　☐Male　　☐ Female
2. Age☐21-30　　☐31-40　　☐41-50　　☐ 51-60　　☐60 and above
3. Highest Level of education/ qualification:
☐College diploma　☐　　Bachelors degree　　Masters degree
Doctorate

PART B:

In the following section, where provided, the answers have been coded as follows:

NA - NOT APPLICABLE	**3 - SOMETIMES/PARTIALLY**
1- NEVER/DO NOT KNOW/NOT SURE	**4 - OFTEN/SUBSTANTIALLY**
2- OCCASIONALLY/NOT BEING ADRESSED/NOT IMPORTANT	**5 - ALWAYS /FULLY**

1. Department / research unit
   _____

2. Number of research projects currently involved in
   _____

3. Is there a forum(s) for sharing research findings or any other new knowledge obtained in the course of research?
   　　☐Yes　　　☐No

4. If yes, what is its frequency?

☐Daily   ☐Weekly   ☐ Monthly   ☐Other (please specify) _____

5. Is recording and sharing knowledge a routine and like any other daily habits for employees at KARI?
    ☐NA ☐1 ☐2 ☐3 ☐4 ☐5

6. From the table below, what means do you use to share knowledge gained in the field?
    Key: On a scale of 3 to 1, please indicate 3 for the means most commonly used, 2 for the one moderately used and 1 for the one not used.

Method	Rating
Face-to-face	
Discussions groups	
After project review	
Story-telling	
Workshops	
Seminars	
Conferences	
Email	
Telephone conversation	
Blog	
Online discussion forum	
Community of practice	
Organization intranet	

7. Is knowledge sharing an integral part of research at KARI?
    ☐Yes ☐No

8. Are the employees co-operative and helpful when asked for some information or advice?
    ☐NA ☐1 ☐2 ☐3 ☐4 ☐5

9. Is knowledge sharing seen as a strength and
    ☐NA ☐1 ☐2 ☐3 ☐4 ☐5

10. Is knowledge hoarding seen as a weakness?
    ☐NA ☐1 ☐2 ☐3 ☐4 ☐5

11. Is there good intra-team communication and sharing of knowledge?
    ☐NA ☐1 ☐2 ☐3 ☐4 ☐5

12. Is good knowledge management behavior like sharing, reusing knowledge actively promoted on a day-to-day basis in the organization?
    ☐NA ☐1 ☐2 ☐3 ☐4 ☐5

13. Are individuals visibly rewarded for knowledge sharing and reuse?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

14. What motivates you to share knowledge with:

Fellow researchers	
Farmers	
Extension workers	

15. Are there certain things that make you more comfortable sharing knowledge with close friends than with other researchers ☐who are not ☐ very close to you?   Yes   No

    a. If yes, please name them:

    b. Do these close friends reciprocate by also sharing knowledge with you?
        ☐ Yes   ☐No

    c. Are these close friends in the same research unit as you?
        ☐ Yes   No

    d. If not, which department(s) do they belong to?

16. On average how frequently do you share agricultural research
knowledge with fellow researchers? (please tick one)

☐ Daily ☐ weekly ☐ monthly ☐ not at all

other(please specify)_____

17. With regard to knowledge sharing, you can describe team members in
your current research project as? (please tick one)

☐Cooperative ☐ not cooperative

b. Please explain the reason for your answer above

18. Do you recognize knowledge as a key resource?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

19. Are people at KARI aware of the need to proactively manage
knowledge assets? ☐
☐NA ☐1 ☐2 ☐3 ☐4 5

20. Do you believe that new knowledge empowers you?
☐Yes ☐ No

21. Do you feel like you benefit when you share knowledge
☐ Yes ☐ No

22. Does trust determine who you share knowledge with among your
fellow researchers?
☐Yes ☐No

23. Do you benefit from the knowledge shared by other researchers?
☐ Yes ☐ No

24. What discourages/prevents you from sharing knowledge with:

Fellow researchers	
Farmers	
Extension	

workers	

25. Do you receive any rewards from KARI when you share knowledge?
☐ Yes   ☐ No

26. Are there any incentives put in place to encourage knowledge sharing among researchers at KARI?   ☐ Yes   ☐ No
    a. If there are any incentives, please name them.

27. Does the top management at KARI recognize knowledge management as an important part of the organization strategy at KARI?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

28. Is there top management representation for Knowledge Management?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

29. Is internal staff rotation actively encouraged to spread best practices and ideas?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

30. Are the teams in the organization effective? Are self managed teams composed of individuals capable of learning from each other?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

31. Is there a vision for how Knowledge sharing should be integrated into the organization?
NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

32. Are there defined responsibilities and budget for Knowledge Management initiatives?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

33. Is there a clear ownership of Knowledge Management initiatives by KARI?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

34. Does KARI improve its skills for sharing knowledge by learning from other organization's learning processes?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

35. Does the organization systematically assesses its future knowledge requirements and execute plans to meet them?
☐ NA ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

36. Is knowledge sharing across departmental boundaries actively encouraged? (Not similar to ''incentives'')
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

37. Are Key knowledge assets such as famer knowledge identified, preserved and maintained?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

38. Are there any training and development programs in Knowledge Management for staff in the institution?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

39. Are resources committed for ongoing training and development of individuals?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

40. In the day-to-day working environment, is it easy to find the right information?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

41. When a team completes a task, does it document what it has learned?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

42. Are ideas for alliances and joint ventures constantly reviewed and acted on when necessary?
☐NA ☐1 ☐2 ☐3 ☐4 ☐5

Thank you for your time and assistance.