INNOVATION SYSTEMS MODEL FOR DISSEMINATING HARVESTING AND POST-HARVEST HANDLING INFORMATION TO GAYAZA COFFEE GROWERS' COMPANY LIMITED IN MUBENDE DISTRICT, UGANDA.

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A dissertation submitted to Kyambogo University Graduate School in partial fulfillment for the requirements for the award of a Masters' degree in Vocational Pedagogy of Kyambogo University

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Declaration

I Saidah Nakyanzi declare that this is our own piece of work in collaboration with the work place that has not been submitted to any institution for any award.



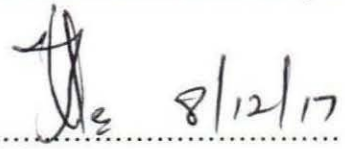
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Approval

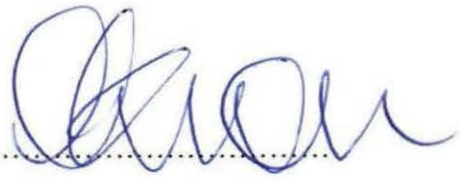
We the undersigned acknowledge that this is an original piece of work entitled ''innovation systems model for disseminating harvesting and post harvesting information to Gayaza coffee growers' company Limited in Mubende District, Uganda''. It has been done under our technical mentorship as supervisors. We therefore recommend this action research dissertation for submission to Kyambogo University graduate school.



.....

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The principal supervisor.



.....

Dr. John James Okiror

Second supervisor.

Dedication

This piece of work is with pleasure dedicated to the family of Mr. Nkugwa Ismail, in-laws but mostly to Talha Ismail K and Muniira Ismail N-our children; especially for the times they felt that mummy hadn't been there for them.

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List of abbreviations/acronyms

BARI	Bachelor or Agricultural and Rural Innovations
GCGC	Gayaza Coffee Growers Company Limited
YARD	Youth Association for Rural Development
MVP	Masters in Vocational Pedagogy
KCP	Kaweeri Coffee Plantation
KCFA	Kaweeri Coffee Farmers' Alliance
LR	Lead Researcher
DAO	District Agricultural officer
UCFA	Uganda Coffee Farmers' Alliance
AET	Agricultural extension and training
IS	Innovation Systems
MAAIF	Ministry of Agriculture, animal and fisheries

Operational definition of key terms

i. Agricultural extension models refer to the systematic approaches, techniques and tools that can be employed during extension service delivery.

ii. Innovation systems model is the process by which value is added to existing strategies, methods and tools in order to transform service delivery.

iii. For this study, the model is a graphical illustration of the process used in transforming information service delivery at Gayaza Coffee Growers' Company Limited.

iv. Agricultural extension is the process of disseminating agricultural information usually through teaching, learning and training.

v. Harvesting is the act of picking mature and or ripe coffee beans from the tree.

vi. Post-harvesting is a stage in coffee production that involves care for harvested beans before they are sold off

vii. Quality of coffee beans is the degree to which internal and external features of coffee beans meet one's level of satisfaction.

viii. Coffee price is the value that will purchase a particular quantity, of coffee beans.

ix. Rural development is the process of transforming non-urban areas through enhancing their economic activities and general livelihoods

Abstract

Farmers have consistently noted the inadequacy and inconsistency of agriculture extension services. In Uganda, provision of agricultural advisory services has been down played to simply distribution of inputs. This study sought to investigate, design, and test an innovation systems model for improving information dissemination on harvesting and post-harvest handling. The study also tested the effectiveness of the model for improved information dissemination within Gayaza Coffee Growers Company Limited. Focus group discussions, observation, interviews, future workshops were the main data collection methods; the river code, work process analysis, farmer visits checklist and observational protocol as the main tools with triangulation as the basis for data validity. Inadequate and inconsistent extension services arise from gaps within the extension methodology, information dissemination techniques and undermining the power of collaborative rural development. The innovation systems model was designed basing on a reflection of the current agricultural extension methodology, effective and sustainable information dissemination methods and transformative learning for rural development. Testing focused on the pillars of training dynamics, motivation and collaboration. The research was thus grounded on wenger's social learning theory and the philosophies of agricultural extension to mold practices for rural development. Selective picking as the most recommended technique of harvesting needs to be upheld and strengthened, technical persons should perceive farmers as adult learners and learning as a mutual experience sharing process and further testing of the model within other farmer groups could better its effectiveness.

CHAPTER ONE

INTRODUCTION

Introduction:

This chapter presents highlights about vocational education and training, a general background to the study, statement of motivation, a statement of the problem, objectives scope and rationale for the research.

1.1 Vocational training and vocational pedagogy as a field

Vocational training is the practice of preparing persons for specific crafts to which their calling is oriented. The practice revolves around the interplay of the mind, heart and body to equip people with knowledge, know-how, skills and/or competences required in particular occupations and ably suit the needs of the labor market (CEDEFOP, terminology of european education and training policy- aselection of 100 key terms, 2008). Gone are the decades when vocational training was confined to certain trades like welding, automotive services and carpentry- the horizon has however expanded with the evolution of time. Today, a wide range of job functions like agriculture extension, information communication and Technology, tourism management, fashion and design, general education, food and beverage management, among other callings all subscribe to vocational training.

In line with the above, Vocational Education and Training(VET) is also known by the name career and technical education (CTE)' and it provides candidates with a clear edge in job searches CEDEFOP(2008), because they possess the knowledge and practical experience to enter a specific field. Such kind of training focuses on practical applications of the skills learned or acquired and it provides the much needed hands-on instruction in a specific trade that later deem someone a competent practitioner. It thus clings on collaborative strategies between training institutions and the world of work in order to address the missing link between education and practice so as to produce more innovative and highly skilled workers that can address the challenges of our current fast-pacing society.

However, Nilsson(2010) acknowledges vocational education and training as an engine for economic growth and vehicle for social inclusion through its capacity to improve per capita income as a result of self-employment, general service delivery and additional gross domestic

product. Skills acquisition takes place in society largely through on-the-job training that may or may not result in recognized qualifications Barber (2003) as well as formally established training institutions. During the process, different methods, approaches, styles and tools are employed to ensure that learning takes place and validation of learning outcomes is achieved by the learners' capacity to respond to specific outcomes as may be required for a unit or a qualification as classified under the National qualifications framework. (parliament, 2009). The education system therefore, has stretched further to credit and appreciate possession of employable skills irrespective of where one has undergone training by issuing a workers' pass that precisely spells out one's potential for practice in the labour market.

On the other hand, how to effectively build human capital to promote and sustain economic growth is critical to most developing countries Prashant Loyalka (2013), and a number of developing countries Uganda inclusive, currently identify vocational education and training as a way out. Despite the increasing interest in VET among policymakers, there is surprisingly little evidence from developing countries as to whether vocational high school, especially in comparison to academic high school, actually helps students acquire specific and general skills. Although VET is an ideal way out, specific skills should be supplemented with general or life skills if we are to attain sustainable economic growth. International literature shows that a solid foundation of general or cognitive skills (for example, in math, reading and/or science) helps employees succeed in the workplace Levy and Murnane, (2004), (Prashant Loyalka, 2013). Similarly, the mastery of general skills has been shown to have a significant and long-term impact on the wages of high school graduates (Tyler, Murnane, and Willett, 1995).

Furthermore, it is inevitable to acknowledge that the Labor market consistently adjusts to technological innovations and this impacts on the job stability for individuals as well as economic stability for countries. This calls for lifelong learning, which is contingent on a foundation in general skills Kezdi 2006, (ibid 2013). VET is a catalyst in the shift towards a knowledge intensive and practicing economy and CEDEFOP, The benefits of vocational education and training, 2011 adds that by 2020, almost all jobs will require a medium-level qualification that will often be achieved by some form of VET. We thus acknowledge the transformation in attitude towards VET over the years in a bid to train job creators by the beneficiaries of education.

It is worth noting that the paradigm shift as an approach towards empowering VET in Uganda within the BTVET plan can be sustainable and resourceful with appropriate budget allocations to VET. Collaborative training programs amongst institutions and world of work, a dynamic curriculum development process, citizen sensitization and vocational teacher development programs (Fellow, 2001/2002) could further enable realization of transformation within the VET arena.

1.2: Background of the study

1.2.1 Historical background

Inadequate and inconsistent agriculture extension services consistently surface amongst the farmers because agricultural Extension is accorded low value within policies in favor of distribution of inputs. In the absence of an integrated and holistic service delivery strategy that is essential for agricultural transformation UFAAS (2014), stakeholders' capacity for innovation and appropriate use of enabling technologies is underutilized. We thus need to acknowledge the need for active participation rather than mediation by all stakeholders not only to minimize communication barriers but also directly have a feel of addressing the felt needs.

One of the philosophies of agriculture extension is that we should start where people are, with what they have and help them to help themselves. For effective information dissemination and service delivery, the study adapted Wengers' theory of social learning through informal and non-formal learning approaches to mold existing practices –hence local innovations. According to Wenger (2008), learning through Communities of practice proposes a social theory to learning in which we learn and transform through "practice" and meaning constructed from our experiences results into learning. The implication of learning within in a community is a sense of belonging that they develop to be able to identify themselves with unique features gained from the learning process. Such a theory is worth for a participatory action research design that the study took on since our intention was to enable Gayaza Coffee Growers Company develop meaning from their previous experiences, mold current practices through practice with value addition and identify themselves as a transformed community.

1.2.2: Theoretical Background

Innovation systems is the process by which value is added to existing strategies, methods and tools in order to transform service delivery. The Innovation systems model presents a breakthrough from the conventional linear extension approach to research and development (Agau AE, 2008). It explores the extent to which collaborative measures amongst actors along the production chain can create and diffuse knowledge, skills and values through consistent social-economic interactions to transform the wellbeing of a society.

Low prices in the coffee market have caused financial hardship among coffee farmers' incomes to the level of almost abandoning the cash crop, yet this has a direct correlation with the quality of coffee beans availed to the market. The procedure of harvesting and post harvesting greatly impacts on the quality of coffee beans and consequently, the respective prices. Quality certification in terms of conformity and compliance with specific legislation is a strategy for quality coffee production and marketing that is implemented by Uganda Coffee Development Authority in Uganda.

The quality of the coffee fruit at the stage of harvesting is dependent on the condition of the beans, age of harvesting and method of picking, (Illy, 2005). Therefore, UCDA(2014) stipulates that the standard procedure of harvesting coffee according to Ministry of Agriculture Animal Industry and Fisheries should consider harvesting only fully ripe (brick red) cherries by plucking them off the branches because green/ unripe cherries will form black beans. In line with the latter over ripe cherries give defects such as discolored coffee beans, fermented and off flavors to the coffee cup and yet ripe cherries give better quality coffee and thus more money.

Coffee fruits should be put to drying as soon as they are harvested GTZ (2002)and Sinha, (1998), not only because sun drying is a cheaper technique but also adds value in terms of flavor and richness. In addition, quality even at post- harvesting should be maintained by observing the procedure of drying; i.e. should be consistently be done on tarpaulin because drying on bare earth results in earthy smells and soil microbial contamination. Related to the above, coffee cherries should be kept in containers such as baskets and sisal bags.

1.2.3: Conceptual background

Gayaza coffee growers company came into existence after mobilization and a call for out grower schemes by Kaweeri Coffee Plantation (KCP) in 2005 through a collaboration with Mubende district and Kaweeri Coffee Farmers' Alliance (KCFA). Its main objective is to establish farming as a business and train farmers on how to produce and market good quality coffee alongside other food crops. After a period of training and enabling practices in coffee management and marketing the company was set to run independently until to date when they market hulled coffee beans.

The stability and sustainability of GCGC greatly depends on the quality of service that it provides to its members, higher prices for coffee to raise farmers' income as a way of reaping big from the cash crop have not yet been achieved. More so, amongst the challenges along the production chain, harvesting and post-harvesting procedures greatly determine the quality of coffee beans and hence the respective market prices. With the existence of regular extension programs and quality regulatory frameworks, the fact still remains that coffee prices are low as compared to the level of input. We were thus prompted to conduct an analysis of the current situation in order to establish a baseline of the existing situation as proposed by (Kate Wellard, 2013).

1.3: Situation Analysis

Despite the rigor, time and other material resources invested in production of coffee in Gayaza, the price of coffee beans still remains low. A situation analysis of the production process was done with the stakeholders in order to understand the issues affecting quality and price of coffee problem.

The situation analysis undertook interviews with key informants and the farmers, focus group discussions, document analysis, observational strategies and an analysis of the production process. The challenges identified included the use of manual methods to inspect for coffee moisture, lower price of coffee compared to inputs, Pest infestations that lower the grade and quality of coffee, loans by middlemen which are paid back in terms of coffee, the mixture of poor quality and good quality coffee during bulking, lack of bylaws on coffee quality control, limited trainings on harvesting and post harvesting practices and delayed payments by company having sold our coffee. Having identified the challenges, the stakeholders agreed that the most

critical stage along the chain was harvesting and post- harvesting which was subjected to an in-depth analysis in a future workshop.

From the future workshop, the critical phase clarified challenges with respect to harvesting and post-harvest handling which were categorized into four i.e. extension services, environmental factors, marketing factors and Company management factors and a pair wise matrix used to rank them in order to identify the most pressing one. Agricultural extension service delivery mechanisms were ranked most pressing with a wish that if ideal extension procedures had been be taken, then the other challenges could simply be a walkover with a knowledgeable and consistently practicing community. Participants went ahead to fantasize about the ideal procedure of harvesting and post-harvesting that is marketing of processed coffee, grading the coffee using our own machine before marketing and processing the beans at our own plant. Access to loans from the company without collateral, existence of regulations governing coffee quality control within the company and access to high quality planting material. Management of our coffee plantations with irrigation systems, higher and consistent coffee prices by the company that all members sell through the DC' and effective management of coffee pests and infestations. Consistent extension services from the responsible service providers, the company makes enormous profits from produce marketing and has effective management and frameworks for running the company. Our plantations are model farms for the rest of the farmers and members receive annual bonuses from bulk sales.

The reality phase suggested possible interventions to be undertaken that is; village trainings on quality control practices, a coffee bill to be initiated and processed and members pick only the ripe berries. Members dry the coffee consistently and using tarpaulin and store coffee in sisal bags, on floors with pallets and stacks. The production department to partner with enforcement team at the district to sensitize farmers on coffee quality control, establishment of coffee quality control by laws at village level and offer respective training to company facilitators. Devise means of generating income for the company to facilitate its activities/ operational costs e.g., a there is a proposed deduction off members' sales to be approved by the members, the use of a moisture meter to inspect for coffee moisture and sample huller.

1.4: Statement of Motivation

As an agricultural educator and rural development practitioner, I always wondered why farmers have hardly transformed despite the regular agricultural extension services and approaches. I was thus inspired to conduct an action research and witness the transformation that collaborative research can cause within the rural community.

1.5: Introduction to objectives and problem

The situation analysis was intended to avail practical evidence regarding the livelihoods of members of Gayaza coffee growers. We wanted to rule out general factors affecting farmer organizations and specifically analyze the condition of the members in relation to their objectives. The situation analysis revealed that, despite the existence of GCGC for over ten years and availability of company facilitators, government agricultural extension service providers, volunteers and NGOs working with the company, farmers still marketed hulled coffee at general prices. This directly called for the first objective of identifying the main procedure of harvesting and post-harvesting of coffee in GCGC Ltd as our area of concern from the general chain of coffee production and marketing.

Although there are existing structures and personnel to facilitate agricultural extension, the dissemination methods used do not reflect consistent adoption as a measure of transformation amongst the farmers. We thus proposed short and long term interventions that were to be taken on by the respective stakeholders during a collaborative implementation process so as to design and test an innovation systems model of disseminating harvesting and post-handling practices. Determining its effectiveness took on an evaluation process within a workshop by the participants.

1.6 Statement of the Problem

Low prices for coffee beans on the conventional market are as a result of low quality of the beans. Along the entire production chain, harvesting and post-harvesting is a stage that involves more service providers besides the farmer and greatly impacts on coffee quality. Guidelines on postharvest handling through extension services are available although consistency in adoption is not reflected. With effective delivery of harvesting and post-harvest handling procedures, farmers may be able to improve their productivity especially in a case

where new technology is easily adopted and diffused amongst the farmers. For Gayaza Coffee Growers with a membership of 150 undertaking coffee production among other enterprises, an innovation systems model can be used to improve extension service delivery and productivity. Therefore, the study was designed to develop and test an innovation systems model for disseminating harvest and post harvesting practices to coffee farmers.

1.7: Purpose

The study sought to investigate and design an innovation systems model for improving information dissemination on harvesting and post-harvest handling practices for quality coffee production among the farmers of Gayaza Coffee Growers Company Limited.

1.8: Specific objectives

i. To identify the main procedure of harvesting and post-harvesting of coffee in GCGC Ltd.
ii. To design and test an innovation systems model for disseminating harvesting and post harvesting practices in GCGC.
iii. To determine the effectiveness of the model in disseminating extension information for GCGC Ltd.

1.9 Research questions

1. How does one determine that the coffee fruit is ready for harvesting?
2. How is the mature coffee fruit harvested?
3. What care is given to the harvested coffee fruit before it is marketed?
4. How should information on harvesting and post-harvesting be disseminated and what challenges are encountered?
5. Which measures can be undertaken to improve the dissemination of harvesting and post-harvesting information?
6. How are innovation systems models designed, implemented and evaluated?

1.10: Justification of the study

Income generated from the sale of coffee is greatly influenced by the quality of coffee among other factors and yet quality is highly determined by the procedure of harvesting and

post-harvesting. Although training and extension programs are regularly conducted, the inconsistence in adoption amongst the participants justified participatory determination of an extension model for sustainable interventions within GCGC Ltd.

(Zeller, 2007).

1.11: Significance of the study

The research aimed at empowering the stakeholders to realize and take on activities geared at enhancing sustainable information dissemination mechanism for the farmers of Gayaza Coffee Growers Company. This is envisaged to improve the quality of coffee, leading to better prices and consequently better livelihoods of the farmers.

1.12: Scope of the study

The study was limited to GCGC Ltd in Mubende district to which I am a volunteer extension facilitator. The other main coffee producer within the district is Kaweeri Coffee Plantation among others. Our focus of study was harvesting and post-harvest handling procedures as a stage that greatly impacts on coffee quality through the diversity of stakeholders engaged. The stage singled out inconsistent and inadequate extension services as the priority problem that required intervention.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The literature is in correspondence with the study objectives as follows: coffee harvesting and post-harvest handling practices; design and implementation of innovation systems model; and effectiveness of extension innovation systems model.

2.1 Coffee harvesting and post-harvesting practices

The price of coffee on the world market has always fluctuated due to quality since the 1980s an issue that even alliances have yet failed to address for instance, by December 1988, the Coffee Marketing Board was unable to pay farmers for new deliveries of coffee or to repay loans for previous purchases. The board owed Ush1, 000 million to its suppliers and USh2, 500 million to the commercial banks, and although the government agreed to provide the funds to meet these obligations, some of them remained unpaid for another year and in revenue terms, Uganda's overall benefit from the world price increase was small, as prices for Robusta coffee the major export remained depressed (Zeller, 2007).

According to (Njoroge, 1998) however, Coffee farmers aim at producing high yields of good quality coffee which they deliver to factories for processing. Factories carry out the processing with care, to end up with a high quality product, acceptable in the market. Therefore, quality is an indispensable part of coffee farming, responsible for determining the money earned.

Following decades of total state control of the sector, the coffee industry was fully liberalized between 1991 and 1992 and is currently entirely in private hands. However, export quality control remains the responsibility of the Uganda Coffee Development Authority (UCDA) that grades, liquors and classifies all export shipments (The world's weekly magzine, 2016). UCDA fulfils the mandate of promoting and overseeing the development of the entire coffee industry through: supporting research; promoting production; controlling the quality and improving the marketing of coffee in order to optimize foreign exchange earnings for the country and increase farmer's earnings.

UCDA's Vision is "Creating a sustainable coffee industry with high stakeholder value for social economic transformation'' and the mission is to promote production and marketing of

coffee; support management of pests and diseases; coffee replanting; support sustainable coffee production initiatives; provide technical extension services; ensure quality improvement of coffee along the value chain; promote value addition and domestic coffee consumption as well as harmonize activities of the coffee subsector associations in line with industry goals and policies.

In addition, (MUNNO VOICE, 2015) reports that according to the International Coffee Statistics, Uganda bounced back in the 2014-2015 in the 7th position after exporting 2.24 million 60kg bags and in the process upstaging Ethiopia to become Africa's biggest coffee exporter. However, though it is still way behind Brazil's 27.3 million bags- the world's top coffee producing country for many decades – Uganda stands a chance to be among the top five (5) in the next few years when big projects aimed at increasing production start to pay off. Indeed according to the latest report from UCDA, coffee farmers stand a chance to cash in from their coffee farms. Coffee quality is a parameter influenced by a wide range of factors and the criteria used to measure quality includes raw bean size, shape as well as color (Njoroge, 1998)

Therefore, the standard procedure of harvesting coffee according to MAAIF should consider harvesting only fully ripe (brick red) cherries by plucking them off the branches because green/ unripe cherries will form black beans. Over ripe cherries give defects such as discolored coffee beans, fermented and off flavors to the coffee cup and yet ripe cherries give better quality coffee and thus more money. Harvested coffee cherries should be kept in containers such as baskets and drying should be done on tarpaulin because drying the coffee on bare earth in earthy smells and soil microbial contamination. Immature, diseased, pest infested, overripe cherries should be sorted out and processed separately and all extraneous materials such as twigs, leaves, stems and stones should be removed (UCDA, 2014).

Furthermore, ready to harvest fruits on the coffee tree turn a dark berry color -- this is about 8 to 9 months after flowering has taken place then ripe fruits can be plucked by hand, or picked with small rakes, or else with poles: the first two systems are used where low-cost labor is available, and they are more selective; the pole system is quicker, but less careful; and needs further berry-cleaning (Hicks, 2001). (Fukunaga, 1986), adds that a danger in picking the green ripe and very ripe berries which should be noted, however, is that at this stage the berry does not have sufficient mucilaginous coating to protect during pulping because some injury may occur during the process which will lower the quality of the beans.

In addition, one of the chief causes of quality deterioration in coffee is the decomposition of cherry pulp before pulping (Fukunaga, 1986). Both before and after -peak harvesting, farmers who are not aware of the detrimental effects which are taking place, may leave the harvested berries in bags or boxes for more than 4 hours, and in some cases for several days; the result is that much of the mucilaginous coating of the bean is already decomposed before pulping and the bean is eventually damaged in the pulping process.

Similarly, the heat generated by fermentation of the pulp causes the coffee bean itself to ferment, resulting in discolored and sour beans. The sour characteristic of beans which have fermented is one of the worst defects in quality of coffee. It is thus recommended that coffee beans be pulped or put under the sun to dry on the same day it is harvested, within 12 hours because once harvested, the quality of the bean cannot be improved by presently known processing methods (Hicks, 2001). On the Other hand, the quality of coffee can be ruined in many ways after it is picked and one of the secrets in the production of quality coffee is to process the berries as soon as possible after harvesting to avoid deterioration of the bean.

During sun drying, beans may take about 5-10 days of consistent drying under sunny weather although it may take much longer if the conditions are cloudy. Similarly, the thickness of the beans on the drying area also affects the drying period (Njoroge, 1998). (Illy, 2005), Adds that, during drying, cracking of the parchment should be avoided as it exposes the bean and gives an undesirable color and quality in the soft black stage.

In addition, storage of dried coffee should be in an atmosphere with low relative humidity and warm temperatures to avoid the beans absorbing or losing moisture. Absorbing moisture causes bleaching of beans and loss of desirable flavor.

Usually, equipment needed for the picking of coffee is simple and inexpensive for it may be woven from locally available materials like sisal, banana leaves and stems, or others. These usually include baskets for picking and carrying the harvested beans, holding hooks for bringing branches into position for picking, and larger containers for transporting large quantities of berries from the fields.

2.2 Design and implementation of an extension innovation systems model

Innovation systems approaches view innovation in a more systematic, interactive and evolutionary way whereby new products and processes are brought into economic and social use through activities of networks of organizations mediated by various institutions and policies (Hall et.al., 2004). Therefore, innovation systems are the groups of organizations and individuals involved in the generation, diffusion and adaptation, and use of knowledge of socio-economic significance, and the institutional context that governs the way these interactions take place. According to Metcalfe (1995), a system of innovations is that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provide the framework within which governments form and implement policies to influence the innovation process. It's thus a system of interconnected institutions to create, store and transfer knowledge, skills and artefacts which define new technologies.

Conventional approaches to agricultural development have tended to regard innovation as the product of research and view its dissemination as a largely linear process confined to researchers, extension staff and farmers. The key challenge to effecting impact however is perceived less in terms of devising new technologies-doing different things but rather in terms of bringing about new changes in how the innovation system works. This justifies a multi-stakeholder platform to better the livelihoods of Gayaza coffee growers company Srinivas (2007), participating within the active stages rather than passive. The main objective of Gayaza coffee growers company is to embrace farming as a business through coffee production alongside other crops. However, the essence of coming together for collective marketing was to enhance livelihoods through better prices although that has essentially been recognized. (Zeller, 2007)), forwards that larger farmers and farmers who have high-quality coffee may have a better bargaining position when dealing with private buyers (Mosheim, 2002). The argument calls for innovative mechanisms through a collaboration with other stakeholders to enhance the quality and prices of coffee.

Therefore, an innovation systems model was proposed because innovation systems are a way forward for rural development in Africa, and (Oubenga Adesida, 2016), forwards that a broad berth for experiment, equal opportunities for individuals and households and an environment that rewards risk taking as core pillars for effective innovation. In my opinion, a

variety of rural development models have recently been applied although they seem to be top down procedures and have barely yielded impact with regard to agricultural productivity. Besides, agriculture needs to be viewed as a knowledge based entrepreneurial activity since "smart investments" (Juma, 2011) in agriculture will have multiplier effects in many sectors of the economy and help to spread prosperity

Further to that is that the existing reforms and changes in knowledge structure of agriculture explicitly indicate that the traditional agricultural research and extension system alone cannot sufficiently address the challenges of the new trends. (Etal, 2oo8) Elaborates how the innovation systems approach offers a holistic and, multi-disciplinary approach to innovation and processes, incorporating emerging reforms and approaches for agricultural and rural development. It is also worth noting that innovation systems have gained ground in policy and academic circles in the production of scientific and technological knowledge hence the current pressure to adapt the approach in decision making by an array of international and national bodies like the American Development Bank, world bank, Organization for Economic Cooperation and Development(OECD), among others. The move is geared at embracing the shift from research and development towards innovation Dantas (2005), and outcomes by orienting the activities towards results.

Riikka Rajalahti (2008), forwards four crucial elements in the diffusion of innovations that is; the innovation itself as a perceived new idea or technology, communication as the continuous process of human interaction to spread the idea, a social system for collective problem solving and Overtime as the duration for reflected adoption practices.

2.3 Effectiveness of the innovation systems model

The current practice is that the trainer mobilizes farmers with in their groups or parishes, prepares them for training on a particular topic, delivers the training at a convenient location and thereafter, farmers may ask questions or raise any other issues according to their need. The facilitator is also designated and facilitated to conduct at least eight (8) trainings within a sub-county per quota of a financial year, let alone the large number of parishes and farmer groups in each parish.

Basing on such a description, one would easily say that the existing structure and methodology does not provide reliable and adequate extension service delivery; this is because, even with rebranding procedures from agricultural extension education- National Agricultural Advisory Services (NAADS) - prosperity for all, operation wealth creation under the Uganda Peoples' Defense Forces, levels of adoption and general agricultural production and rural development are barely insignificant. This gives an implication that we have a shared responsibility for rural development through partnering with local personnel who can adapt development programs easily to bring together skilled personnel to deliver effective training for transformation (a model for training in rural farming communities, 2013).

In line with the above therefore, the model should not only impact on extension information dissemination in Gayaza Coffee Growers' Company but also set a platform for Policy, institutional and market led innovations to provide the framework through which services are delivered. To supplement that should be an enabling regulatory framework for instance through appropriate budget allocation, transparency, relevant curricular training programs and facilities, and incentives that allow actors to put new skills to utilization. Effective transport and communication networks coupled with internal and external markets for the products and above all, general innovation mechanisms and Programs that encourage greater openness in organizations to collaborate with diverse formal and informal actors is motivation enough for general rural development (Susan Kaaria, 2008).

However, to enhance innovation capacity it is necessary to invest in learning and capacity building, provide incentives that allow actors to put new skills into use, and also nurture new attitudes and practice (Skilling Uganda-BTVET Strategic plan, 2012) Programs that encourage greater openness in organizations to collaborating with diverse formal and informal actors, introduce organizational and managerial innovations within organizations, or strengthen individual and organizational incentives to develop innovative capacity, should be considered. The organizational or collective innovative capabilities, however, reside in individuals, in the information and technology used by an organization, and in an organization's structure, routines, and coordination methods. Besides nurturing individuals who act as change agents within organizations, the case studies highlight the power of: collective action within and among organizations; flexibility (to allow self-organization); building self-confidence and trust;

fostering preparedness for change; stimulating creativity; and the enabling environment, particularly the policy and funding incentives that permit these characteristics to develop. Policy capacity thus needs to be strengthened to build innovation capacity (Riikka Rajalahti, 2008).

It is worth acknowledging that all farmers do not adopt a new practice at the same time. Farmers are classified in to five adopter categories according to the relative time at which they adopt a new practice that is innovators who are eager to try new ideas, early adopters as great opinion leaders and the early majority who adopt earlier than the average majority. The late majority come in sequence to the early majority and lastly the laggards who adopt last. With the innovation systems model too, we worked within the sequence and the process is still on going as reflected in the action research spiral; reflect-plan- act- reflect. The model may thereafter be modified or strengthened further to suit any other institutional goals and objectives.

CHAPTER THREE

METHODOLOGY

Introduction

In this I present the procedure of how the research was conducted, target population, methods and tools used to collect data and, how the data has been analyzed, validity and ethical considerations.

3.1: Research approach

In order to address inadequate and inconsistent extension problems, the research took on a planning and reflection phase during a situation analysis, implementation of the proposed interventions followed by an evaluation process all bound by collaborative means (Trochim, 2006). Meanwhile, we explored the needs through general experience sharing practices to hear out the voices Creswell (2007)and engaged the people in the stakeholders in studying their own problems so that research would purposefully become part of the change process (Patton, 1990).

A participatory action research design was used to identify, design and implement strategies that enhance the price of coffee through improving its quality at harvesting and post-harvesting as advanced by Creswell(2007) "involve individuals in studying local practices focusing on development and implementing a plan of action".

3.2: Implementation of action production objective

The research commenced with a situation analysis during which a production process analysis was conducted. Focus group discussions, interviews and farmer visits were used to analyze harvesting and post harvesting practices as our focus of study. Possible short and long term remedies to the appropriate information dissemination were suggested and implemented that is on farm trainings regarding harvesting and post-harvesting, sensitization workshops, board and general meetings, facilitator led discussions/trainings, among others in collaboration with the stakeholders. An evaluation workshop where stakeholders assessed the impact of project interventions and the effectiveness of the innovation systems model was conducted. From the evaluation however, the need for re-planning did not arise but progress of the intervention called for continuous motivational mechanisms such as, facilitation for farmer facilitators to conduct the on farm trainings with the produce organizations.

3.3 Study population,

The company comprises a membership of 150 who were the target population through a census sampling technique. More to that was use of the purposeful sampling technique to select key informants (Creswell, 2007)to inform the procedures of the coffee production and marketing and further actively engage in the research interventions. From a general perspective of the research process, interventions hosted a range of 20-70 participants during activities like farmer visits, on farm trainings and workshops while meetings hosted 5-12 participants.

In this regard, the meetings held during situation analysis hosted 71participants of whom were, 3 representatives from the district extension department, 3 lead farmers, 5 PO chairpersons, 6 executive members,3 local leaders, 1 intern student' I research student and 49 were farmers. Two (2) representatives from Uganda Coffee Farmers' Alliance (UCFA) informed the analysis of production processes although they did not make it for the workshop. The logic behind was to have information-rich key informants for the case as forwarded by (Patton, 1990)

UCFA plays a role of coordinating Gayaza Coffee Growers to the coffee buyers that is IBELO in this case. For the benefit of our research, these were identified because they are "good informants" according to (Denzin, 1994), since they have the knowledge and experience that the research requires but also had time to participate and were willing to further do the same.

3.4: Methods of data collection

The data collection procedures were; observation, interviews, future workshops, focus group discussions and document analysis were applied in order to strengthen the study design through triangulation as forwarded by (Patton, 1990)

3.4.1 Observation.

The researcher conducted farmer visits, field visits and observed the procedures of how farmers harvest and care for coffee after harvesting. Visualizations of picking only the ripe berries, harvesting baskets, sun drying on tarpaulin and stores were all observed during the research process. Observation was mainly used during farmer visits, workshops and trainings as a means to analyzing the production process. This was intended to achieve especially the first

objective of identifying the main procedure of harvesting and post harvesting coffee although it consistently cut through the other objectives.

The lead researcher was a participant observer who practically engaged in the above activities, facilitated meetings, focus group discussions, trainings and workshops to enable her develop a chronology of how activities unfold. Creswell, 2007 eemphasizes this by illustrating the use of "an observational protocol" and this was adopted as a tool to illustrate how some of the sessions really transpired. (Attached as appendix 2).

The other tool employed here was the observational checklist (see appendix 5), to illustrate the levels of compliance some farmers with regard to care for coffee during harvesting and post-harvesting. Areas of focus were; harvesting ripe berries, placement of polythene bags or baskets on the floor during picking, sorted coffee after harvesting, drying on tarpaulin or other surface rather than bare ground, appropriate storage(in the open and off the ground),regularity of on the farm trainings.

3.4.2: Focus group discussions

Meetings with Groups of 5-12 participants were conducted amongst the farmers with four produce organizations and the board members to discuss the current situation. The intention was to physically analyze the situation at hand together with the farmers but also have the participants experience a greater stake in owning and sustaining the interventions that would come along with the research. The company offices were used for meetings with the board members and volunteer members' households for the other farmers as illustrated in the pictures (research tools: focus group discussions, 2009)



Plate 3.1: Identification of resource personnel session



Plate 3.2: A Discussion about implementation of research interventions.

3.4.3 Interviews.

Interview sessions helped the researcher to capture the perspectives of participants Patton (1990), regarding how we could advance coffee prices through appropriate and sustainable interventions. This method was mainly geared towards achieving the second objective where participants' views were incorporated in the design and implementation of proposed interventions and the innovation systems model in particular.

During interview sessions however, the researcher facilitated and Clarified issues "to bring to understanding" the interviewer in his/her own world". This role is supplemented by Kvale(2009), who states that "the researcher's integrity" is crucial as the main instrument for obtaining information. A framework in form of an interview guide with the research variables based on the researcher's practical knowledge of the research area, the available literature and evidence from the situation analysis was used. (See appendix 3 and 8)

Interviews were both one on one and group to avail a diversity of experiences and points of view with regard to our focus of study. They were however used because of their capacity to stimulate data enriching responses from the participants and being less costly (Denzin, 1994).

3.4.4 Document analysis.

Besides the company profiles, training manuals, books of accounts, registration books among others, the researcher consistently referred to existing literature both in soft copies on line and hard copies from the library and other sources so as to borrow a leaf from others' experiences (Bowen, 2009).

Designing and implementing a sustainable an innovations model for Gayaza coffee growers' entailed a reflection of our current practices, how they are done elsewhere and an integration of appropriate technology and practices to have a worthwhile extension model. Documents therefore provided supplementary research data that was helpful in contextualizing our research within the field of agricultural extension education (Triad, 2016).

3.4.5 Future workshops

It is worth acknowledging the above as a powerful and enabling tool not only because further synthesizes the entire situation analysis through an intensive discussion regarding the area

of concern, holds participants accountable for the prevailing conditions but also, they collaboratively focus to transform it. The procedure was conducted through four phases; preparation involved welcoming participants, an introduction, and a discussion of rules for the workshop. The critical phase raised challenges with respect to harvesting and post-harvest handling as illustrated below.

Table 1:

Categories of the Challenges Identified

Table 1: ***Categories of the Challenges Identified***

Category	**Underlying challenges**
Inadequate and inconsistent extension services,	- Absence of technical persons on the farms to rightly guide farmers - Wide area of coverage for service providers - Limited number of extension personnel - Incompetent technical personnel - Un reliable methods used in delivering extension information, - Political interferences in mainstreaming the extension service delivery system - Inappropriate research methods in addressing the extension delivery challenge.
Environmental factors	- Drought conditions that yield underweight coffee beans. - Pests that suck juice from ripe berries during harvesting and storage - Deforestation which increases airborne infestations, strong winds may drop coffee trees or break fruity branches. - Climate change that causes general rain and water scarcity due to drying up of water sources, greater sunlight

	intensity, reduced productivity and general under quality produce.
Marketing factors	- Low quality of coffee beans resulting from limited added value(the selling of just hulled coffee beans and no further processing) - Competition from other coffee traders who are not concerned about quality and yet they offer almost the same price - Exploitation by smart middlemen in the guise of linking the company to buyers
Company management factors	- Is a company limited by guarantee and thus does not make profits - Use of manual methods to inspect for moisture content despite the possession of a moisture meter results into compromised coffee quality - Delayed payments having sold our coffee to the company - Higher prices of pesticides loaned out by the company to members - Inconsistent coffee prices by the company - Lack of a law on coffee quality control

A pair wise matrix was there after used to rank the categories in order to identify the most pressing one as shown below;

Table 2: Identification of the Most Pressing Challenge Using a Pair Wise Matrix

	1	2	3	4	Total tally	Ranking
1		1	1	1	3	1st
2			3	4	0	4th
3				4	1	3rd
4					2	2nd

Source: Future workshop held on 15th December 2016

Key;

1: Inadequate and inconsistent agricultural extension services

2: Environmental factors

3: Marketing factors

4: Company management factors

The main reasons for ranking inadequate and inconsistent extension service delivery was that "if we had effective extension service mechanisms, company and environmental factors would be addressed during reciprocated learning sessions to improve the value of the produce and in turn favorably compete on the market" as summarized by one of the company's facilitators.

Participants further fantasized about the ideal procedure of harvesting and post-harvesting, and general ideal situation that is; picking and rather not stripping of only the ripe berries, consistently sun drying on tarpaulin as soon as the beans are harvested and using appropriate storage containers off the ground. Marketing of processed coffee, grading the coffee using our own machine before marketing and processing the beans at our own plant. Access to loans from the company without collateral, existence of regulations governing coffee quality control within the company and access to high quality planting material. Management of our coffee plantations with irrigation systems, higher and consistent coffee prices by the company that all members sell through the DC' and effective management of coffee pests and infestations. Consistent extension through an appropriate approach from the responsible service providers, the company makes enormous profits from produce marketing and has effective management and frameworks for running the company. Our plantations are model farms for the rest of the farmers and members receive annual bonuses from bulk sales.

The reality phase suggested possible interventions to be undertaken that is; Village trainings on quality control practices, a coffee bill to be initiated and processed, and members pick only the ripe berries. Members dry the coffee consistently and using tarpaulin and store coffee in sisal bags, on floors with pallets and stacks. The production department to partner with enforcement team at the district to sensitize farmers on coffee quality control, establishment of coffee quality control by laws at village level and offer respective training to company facilitators. Devise means of generating income for the company to facilitate its activities/ operational costs e.g., a there is a proposed deduction off members' sales to be approved by the

members, the use of a moisture meter to inspect for coffee moisture and sample huller. To design an appropriate mechanism for delivering agricultural extension information. The following scenes illustrate participants during the future workshop:



Plate 3.3: stakeholders actively engaged in the future workshop.



3.4.6: Farmer visits

From experience, visiting farmers did not only carry joy to the hosting household but added value to existing farm practices through sharing with a practitioner and boosted the morale of the host to take part in the research activities. Being an action research, it was meant to carry along a transformation process so, the visit further served as benchmark of how harvesting and post-harvesting is done but also transformation would be felt by such households as indicators to the change process (Sanginga, 2007). During the session, we discussed how farmers go about harvesting and post-harvesting procedures i.e. picking of coffee, status of coffee berries, drying and storage among other issues. The following are some of the scenes illustrating the farm visits;

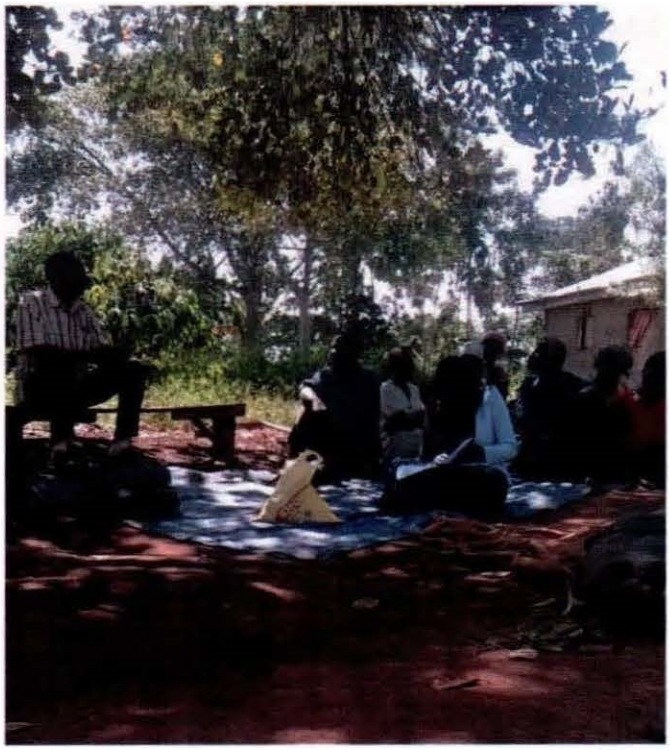


Plate 3.4: members rest at the host's home in kyejunga after a field tour



Plate 3.5: One of the scenes showing members during a farm visit

With the above techniques, the process of producing and marketing coffee undergoes four major stages that is identification of the source of seed, management in the mother garden, harvesting and post-harvest handling, and marketing. Besides the stages, we expounded on the activities undertaken at each stage, tools and equipment used to accomplish the activities, competences one requires to effectively undertake the tasks and the respective challenges encountered.

3.5 Instruments of data collection.

A variety of tools and instruments for data collection shall be used inclusive of the following

3.5.1 An interview guide.

An interview guide containing questions respective to the research objectives was used because they provide direction to the discussion between the interviewer and interviewees with respect to the topic that is the work process analysis in particular (Patton, 1990). For purposes of minimizing loss of information as a result of facilitating and recording, the phone was also used to record video scenes as well as taking still photographs having consented with the participants. Note taking of the major points made by the participants in a logbook was also used. See tools as appendices 3 and 8.

3.5.2 A log book.

The researcher regularly recorded the research proceedings in a log book that contains raw data about the research. This was later used as point of reference not only for reflection especially during presentation but also data analysis.

3.5.3 An observation protocol.

As forwarded by (Creswell, 2007), this was employed to develop a "chronology of the way activities unfolded" during the future workshop and other research activities. It thus gives a picture of what really happened in the research field as attached in appendix 2.

3.5.4 A river code.

Like the name goes, it is a visualization of the role play of a river on the floor, where three dumb persons cross the river in two different ways; one was carried on the back and the other held by hand while pointing to the stepping stones. The one carried was dropped at an island to imply that it is always better to help one learn how to fish than always provide fish for them and, he was so heavy for the carrier to help him cross through-a syndrome that NAADS branded. It is SWOT analysis tool where the source, represents the current situation; the mouth for ideal situation; stepping stones in the river as strengths; slippery stepping stones, flora and fauna in the river as threats; the existence of a river and assistant in crossing the river as opportunities; and the fear to cross and desire to be carried as weaknesses. The tool provided a basis and platform for implementing the proposed interventions that is on farm training sessions, sensitization workshops, farm visits and engagement of major stakeholders with a unanimous zeal to be held by hand and not to be carried (Sanginga, 2007) and (Thomas Pircher, 2015).

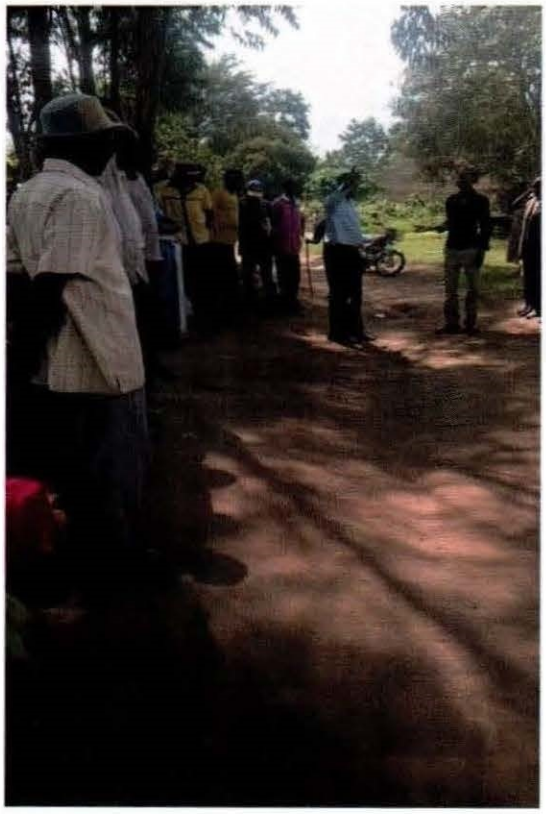


Plate 3.6: The visioning process and below are the two methods used to cross the river.



3.5.5. Cameras

A camera is used for purposes of taking still photographs and record video sessions as need may arise. These shall be used for reporting but also as evidence of the research activities and interventions.

3.5.6. Analysis of the production process

"As the main instrument for obtaining information" Kvale (2009), the researcher facilitated the process of analyzing the production process as a participant observer so as to ably take part and document the transition. The process identified five main stages that is membership, sourcing for planting material, coffee management in the garden, harvesting and post harvesting, and marketing. We further analyzed the requirements tools and materials for each step, competencies required, work procedure and gaps. A copy is attached as appendix 6.

3.5.7. Observation checklist.

This was used especially to mark the indicators of transition during monitoring and impact assessment as attached in appendix 5.

3.6 Procedure of data collection

In accordance to the research objectives and questions, an analysis of the production process highlighted the stage of harvesting and post-harvest handling as the focus of study; the latter was subjected to an in depth analysis during a future workshop that later raised action points for the short and long run. Mobilization and utilization of resources followed to facilitate an implementation process of designing the innovation systems model, testing it and evaluating its effectiveness. During the sessions, participants regularly took record of the activities and a reflection on the results generally on the flip charts but also in personal notebooks for reference.

3.7 Data Analysis

The field notes in the logbook were transcribed consistently with respect to the research objectives. Codes were later allocated to the findings to help me present better the findings thematically relative to existing literature. The findings further present a conclusion and general recommendations in line with the focus of study (Holm-Hansen, 2008).

3.7.1 Data validity

Triangulation of data collection methods and techniques was greatly adhered to during the research to ensure credibility (Patton, 1990). Therefore, the multiple observers, theories, methods and data sources used helped in overcoming the intrinsic bias that comes from the use of single methods.

On the other hand, other writers like Wolcott (1990a) have little use for validation suggesting that it neither guides nor informs research; the main purpose of this study was to understand the situation better and transform it through appropriate extension service delivery.

3.7.2 Ethical considerations

For purposes of achieving informed consent, the researcher presented an introductory letter (attached as appendix 10) from the Kyambogo University, sought permission and a platform to take on the research project with active participation of the workplace. The purpose of the research were elucidated to the understanding of the stakeholders, principles of respect for people, justice as well as assurance for confidentiality in case of need were adhered to as

forwarded by (Qualitative research methods: a data collectors field guide).The research was collaborative and participatory and, although this was for study purposes, feedback was always be availed to the participating stakeholders as argued.

Research ethics deals primarily with the interaction between researchers and the people they study and whenever we conduct research on people, the well-being of research participants must be our top priority. This is seconded by Ormston(2013) who supplements that research should be worthwhile, with informed consent, voluntary participation, confidentiality and risks were brought to the understanding of the participants.

Table 3:

Table 3: ***Summary of Methodology***

Objective	**Data type**	**Source of Data**	**Instruments**	**Analysis**
Harvesting and post-harvesting procedures	Normative	Farmers, key informants, documents	Production process analysis, interview guide	Triangulation,
Design and testing of the model.	Normative	Farmers, key informants, documents	Future workshop guide, the river code, interview guide, logbook, camera and recorder, observational protocol.	Triangulation
Effectiveness of the model	Normative	Farmers, key informants, documents	Future workshop, an evaluation questionnaire	Triangulation

CHAPTER FOUR

ACTION IMPLEMENTATION, RESULTS AND EVALUATION

This chapter describes the three main aspects of the study, i.e. the procedure of harvesting and post-harvesting of coffee in GCGC Ltd, the design and trial-test an innovation systems model for disseminating extension information and its effectiveness in disseminating extension information on harvesting and post-handling for GCGC Ltd.

4.1 Identification of the procedure for harvesting and post-harvest handling.

The current situation in the coffee production process was analyzed with specific focus on harvesting and post-harvesting procedures along the entire coffee production chain. It involved identification of resource persons and work processes as elaborated below;

4.1.1 Identification of resource persons

The different categories of people involved in the coffee production chain identified were; the board members, the members to Gayaza coffee growers company limited, local leaders, LC officers, members of parliament, district agricultural extension service providers, representatives from Uganda coffee farmers alliance (UCFA), local traders and business persons dealing in coffee production and marketing. These people directly and/or indirectly influence the process of harvesting and post-harvest handling of coffee. During a discussion with the board members we identified the individuals who voluntarily participated in the research sessions. These formed the group of stakeholders who were later contacted individually during meetings by both the lead researcher and the board members to enlighten them about the worth of the research but also call upon them for active participation in the process.

Table 4:

Stakeholders and their respective roles

S/N	STAKEHOLDER	ROLES AND RESPONSIBILITIES
1	Lead researcher	- General facilitator of the research process. - General mobilization of all stakeholders - Provision of extension services- trainings - Conduct farm visits - General monitoring and evaluation - Motivation of participants - Make a final documentation for record purposes
2	District Agricultural Officer	- Provision of extension services- trainings - Mobilization of training materials such as flip charts and markers - General sensitization activities - Monitoring and evaluation
3	Uganda Coffee Farmers' Alliance(UCFA)	- Coffee marketing procedures - Coffee value addition
4	GCGC Executive Board	- Mobilization of farmers - Facilitation and allocation of produce organization(PO) facilitators - Monitoring and evaluation - Secretarial and storage of general records
5	GCGC members	- Active participation in research activities - Mobilization of colleagues for research sessions - Voluntary hosting of trainings - Monitoring and evaluation - Replication of training lessons on to their farms
6	Local leaders	- Consolidation and ensuring the practice of quality control by-laws - Quality control sensitization programs

4.1.2: Analysis of the work processes

The lead researcher with guidance of the mentors designed an interview guide as a tool containing questions that aided the discussion during analysis of the production process. We analyzed the stages, tools and equipment, competences required and challenges encountered during the production and marketing as explained below.

4.1.2.1: Stages of coffee production and marketing

The study identified four stages in the production process. These were; attaining membership, sourcing for planting material, coffee management in the garden, harvesting and post-harvest handling and marketing. This was confirmed during an interview with an officer from UCFA and a focus group discussion with the board members.

The first stage is to register members. This was echoed by the chairperson of GCGC when he said; *"The services of GCGC are available to those who have registered as members"* He also added that people in the neighborhood may benefit indirectly. The company's board members are directly involved in sourcing for seedlings starting with issuance of forms to those who intend to plant and also follow up to guide and confirm the preparation of mother gardens. On delivery, the team conducts the distribution of seedlings and a record of recipients and number of seedlings attained is taken.

Caring for coffee plants in the mother garden is the most laborious stage commencing from planting seedlings into the holes to harvesting. *"This is because it directly impacts on the amount of output from the coffee field at harvesting and also the sustainability of production"*, as clarified by one of the PO chairpersons. The stage takes on weeding to reduce competition for nutrients and application of fertilizers to enrich the soil's nutrient capacity. Shade is provided to freshly planted seedlings to help them harden off and when they are knee –high, they are bent in the direction of sunrise to stimulate multiple budding that later grow into branches (see demonstration in plate 4.1). Planting shade trees within the field, construction of soil and water conservation measures like ridges, trenches, bands and cover crops are the commonly applied conservation techniques. Farm visits, on-farm trainings were surely an enriching experience for us to observe and engage in such management activities (see illustration in plate 4.3).

Pruning of trees and warn out branches is usually done to cleanup, branches are reduced to a maximum of four to ease management and maximize output through appropriate nutrient utilization; elderly branches are often cut just about 15cm from the ground for regeneration. Pests and disease control measures are also handled within this stage as well as water harvesting techniques. It is the stage that greatly calls for practical demonstration as far as information dissemination is concerned since participants may directly copy and apply to their individual fields. Company facilitators spearheaded the trainings on-farm to ably illustrate how coffee trees can be better cared for as show in the plates below;



Plate 4.1: Demonstration of how to bend a knee high coffee plant



Plate 4.2: The DAO, demonstrates appropriate spacing during fertilizer application



Plate 4.3: Farmers engage in a pruning and de-budding exercise.

Harvesting and post-harvest handling involves appropriate harvesting techniques that is selective picking in particular and care for the harvested cherries before they are marketed. The cherries are usually sundried on tarpaulin, regularly sorted right after harvesting, kept in the house overnight to guard the coffee from rain or theft and dried coffee is packed in 100kg sacks for storage. This stage therefore greatly impacts on the quality of coffee cherries availed to the marker hence the respective prices. "*The greater the value added to coffee after harvesting, the higher the price*'' said the DAO during an on-farm training session in Kyamuguma PO.

At marketing, farmers interact with buyers to negotiate prices. GCGC sell the coffee to IBELO Company and they directly deliver the coffee to their offices in Kampala. ''*The main challenge with this is non-payment on delivery and this ruins commitment of members*'' said the marketing manager; so, they would rather opt to sell to local business men and earn cash instead of waiting to be paid.

4.1.2.2: Requirements, tools and equipment

Through a discussion with the board members, we realized that members of GCGC contribute 10,000/= and must be owning at least a coffee field. Sourcing for planting material calls for a well prepared mother garden with holes dug at least 2 by 3 feet with a spacing of between 8-12 feet. Such preparation is followed by a requisition form detailing their names, location and number of seedlings required. During the farm visits, we witnessed prepared fields with holes appropriately dug in preparation for additional planting.

Tarpaulin, sisal bags, Wooden Pallets, Weighing scales, Sample hullers, Moisture meters, Screening sieves and Sample scales are used during harvesting and post-harvest handling. Hand hoes as the main garden tool, forks and pang as are usually used to prepare the fields and Slashers are used for weeding which hardly injures the plant roots. Pesticides are applied in case of infestation within the coffee field or affected crops and watering cans are used to water the newly transplanted seedlings within the field. ''*Pairs of scissors are used for pruning during such preliminary stages*'' added one of the lead farmers.

Coffee is usually spread out on tarpaulin to dry during the day and for storage overnight, dried coffee is often stored in 100kg sacks and placed on wooden pallets during storage. At the store, the coffee is weighed to ascertain the quantity delivered for sale by a member and moisture

content is also checked using a moisture meter. The equipment and tools were mainly observed during farmer visits, on-farm trainings and meetings held at the company headquarters.

4.1.2.3: Competencies required

According to the chairperson, a member expresses commitment to the company by regularly attending to its activities and availing their coffee for sale.

Sourcing for planting material is usually done by elites since it involves reading and writing and these are the board members. Effective management of coffee in the mother garden calls for one's commitment for the laborious tasks on-farm, knowledge of the right planting techniques that is spacing and size of the holes. Knowledge of the right intercrops helps one to have companion plants in the field such as shade trees and cover crops. Knowledge of a diversity water harvesting; soil and water conservation procedures helps one to sustainably reap from the field and some of these include; the growing of shade trees such as the *"Mutuba"* tree, growing of cover crops like lablab which can even be fodder for animals, construction of ridges and bands to control the speed of runoff as well as allowing it to get absorbed into the soil.

''At harvesting, one should be able to identify and pick only the ripe cherries and sort them from broken branches and leaves for cleanup'' added one of the facilitators.

One needs to consistently sundry the cherries off bare ground such as the use of tarpaulin that is common amongst the farmers to prevent contamination by soil flavors and other organisms. The store or room in which coffee is stored should be well aerated, have pallets on to which sacks are placed and swept clean to ensure appropriate hygiene conditions. The tooth test technique should be supplemented with the use of a moisture meter to ensure that the coffee is at 10% moisture content at storage; this is to ensure that it does not develop molds that deteriorate coffee quality. These facts were attained during a focus group discussion together with the board members.

Marketing calls for the greatest level of loyalty and honesty since one handles transactions of all the members and buyers. The marketing manager added that one ought to be tolerant because at this stage, the coffee is delivered at a processing plant for hulling and later loaded onto trucks that are escorted to IBELO offices where the coffee beans are marketed. *'' yes, sometimes you have sleepless nights at the processing factory and thereafter travel in the*

wee hours of the night even when there is no specific salary that you'll earn at the end of it all'' said the marketing manager.

4.1.2.4: Challenges encountered

Less commitment by the members is one of the main challenges encountered arising from disillusionment for the long term existence without achievement of the objectives i.e. the members have not yet identified themselves as a transformed society. Poor quality planting material whose sources are sometime times not verified at times in the guise of donations, bureaucratic procedures that accompany the sourcing of planting material and receiving less than requested for greatly impact on production levels.

Inputs especially fertilizers and pesticides are costly with some that are fake on the market, unpredictable weather conditions arising from climate change and limited number of farm trainings to ably and sustainably disseminate reliable information greatly marginalize the relationship between our inputs and incomes generated from coffee sales.

Sometimes, coffee is stolen from individual fields and stores, bulking compromises the coffee to poor quality since some members may still dry on the floor, harvest unripe berries and extensive drought that compromises the size of the beans. Local business men commonly referred to as middlemen create unhealthy competition since they are not bothered by quality standards, sometimes may offer loans to farmers that are paid back in form of coffee and this compromises farmers' quantity of sales to the company.

The fact that GCGC has a contract to sell to IBELO limits opportunities for other better markets because the main challenge with the buyer are the delayed payments to the farmers to the extent that they are not in position to meet their essential needs even after the sale of their coffee because they have to wait and be paid later- they wish it would be cash on delivery. The loaned fertilizers and pesticides are given at a greater price than the one in the local shops and with this farmers feel cheated. The challenges were identified through a triangulation of methods that is interviews, discussions, the river code, farm visits and observation. A tabulation of the analysis of work processes is attached as appendix 6.

4.2: Design and implementation of the innovation systems model

Technological advancements and general reforms of agriculture surely indicate that the traditional agricultural research and extension system alone cannot sufficiently address the challenges of the inadequate and inconsistent extension services. On the other hand, the innovation systems approach offers a holistic, multi-disciplinary and sustainable approach to transformation through embracing technological advancements and approaches for agricultural development. The design and implementation of a model is thus presented in three schematic areas that is the extension methodology, information dissemination techniques and collaborative rural development. The model is our original piece arising from a situation analysis that ranked agricultural extension service delivery as the most pressing need along the chain of coffee production and marketing, the stage of harvesting and post-harvesting in particular.

4.2.1: Designing of the innovation systems model for GCGC

Areas of focus during the design included a reflection on the existing agricultural extension methodology, appropriate and reliable information dissemination techniques and the strengths of collaborative rural development as explained further in the following sub-themes.

4.2.1.1: Reflection on the current agricultural extension methodology

The current ideology in extension is that the facilitator knows it all as a trained personnel and that farmers listen and ask questions later. This is a misconception because it does not promote reciprocated learning but also does not guarantee the facilitator competency. The current practice is that the facilitator mobilizes farmers with in their groups or parishes, prepares them for training on a particular topic, delivers the training at a convenient location and thereafter, farmers may ask questions or raise any other issues according to their need.

The facilitator is also designated and facilitated to conduct at least eight(8) trainings within a sub-county per quota of a financial year, let alone the large number of parishes and farmer groups in each parish-no wonder, some of the farmers had never seen the District Agricultural Officer at the commencement of the research project. Basing on such a description, one would easily say that the existing structure and methodology does not provide reliable and adequate extension service delivery; this is because, even with rebranding procedures from

agricultural extension education- National Agricultural Advisory Services (NAADS), levels of adoption and general rural development are barely significant.

Collaborative strategies ran through the design process to ensure sustainability of the interventions in form of consultative meetings and the use of a diversity of information dissemination techniques to reach out and have the views of the stakeholders.

4.2.1.2: Effective and sustainable information dissemination

Effective communication creates learning, yet learning is measured in the levels of adoption and transformation, therefore, reliable techniques must be available, accessible and consistent. The design thus identified and tested at least four specific techniques of extension information dissemination. We tapped into the available ICT channels, that is mobile phones, radio and television programs, reflected and analyzed the use of written documents as well as on-farm trainings which were all employed during the implementation stage. We further measured the extent of reliability of information disseminated by each technique so as to ascertain the effectiveness although a combination of them all would be inevitable if we were to realize the transformation because they complement each other.

4.2.1.3: Transformative learning for rural development.

The design arouse from a reflection on Wenger's social theory of learning which spells out the pillars of transformative learning that is designing practices into modes that enhance the identity of a particular social group. We therefore added value to participants' experiences within a collective visioning journey rather than super imposition to identify GCGC through an innovation systems model.

The main strategy employed here was to place the stakeholders in the driving seat and the lead researcher as the general facilitator of the design process. Contributions from each category of stakeholders were forwarded, analyzed into an action plan (see appendix 1) and tasks for accomplishment allocated to each respectively. At the time of reflection, successes and constraints that would arise would be responsibility of the multi-stakeholder engagement in the research activities.

4.2.2 Implementation of the innovation systems model for GCGC

Like the design, the implementation stage took on an actual practice of the interventions proposed during the design with respect to extension methodology, information dissemination techniques and collaborative rural development as presented below;

4.2.2.1: Extension model testing,

The research adopted an all-round methodology whereby the participants were not only the farmers but also other development partners and leaders, identification and prioritization of challenges was all inclusive, resource identification and mobilization was collaborative, and, implementation as well as the impact assessment as a role of all the stakeholders. The role play of the river code was a real visioning tool where by the journey from the source to the mouth required a collective responsibility of all the participants in utilizing the resources/ strengths which were the stepping stones and a dumb facilitator to ably reach the mouth.

Training dynamics

The trainings conducted displayed a distribution of tasks to each facilitator instead of a single general trainer for all the topics because the company facilitators are knowledgeable through non-formal training but also, to build their confidence in carrying on the practice even in the absence of the DAO and lead researcher. They were practically an experience sharing session starting from what farmers know and how they go about the practice of harvesting and post-harvesting and supplementation was done in cases where need arose. Demonstration was part of the trainings for example to illustrate the difference between picking and stripping, pruning and de-budding, bending and supporting coffee trees, ripe; semi-ripe and green coffee beans, clean and unclean beans, semi-dried and completely dried beans, healthy and toxic dried and stored beans, among others.

In addition, the trainings took on both manual and scientific parameters so as to ensure the use of appropriate technology for instance, the tooth test and use of a moisture meter to confirm that coffee beans are dried completely, the existence of molds on dried coffee beans to indicate unsafe beans but also-the extent of toxicity by aflatoxins. Generally, on farm training sessions addressed the stages of seed sourcing, man agent in the mother garden through a discussion of agronomic practices, harvesting and post-harvesting procedures to coffee

marketing not only because of the need to demonstrate but also the presence of resource personnel.

While at the farm, the general group of farmers were divided into two sub-groups of about 10-15 depending on attendance by members of the produce organization; one asked to mention the good practices on the host's field that they could take on and the other, the practices that are unpleasant and needed to be addressed. The responses generally cut across agronomic practices like spacing of coffee trees, soil and water conservation measures such as growing of shade trees, mulching and trenches or holes, existence of pests and/or diseases, coffee intercrops, weeding and general field management, harvesting, drying and storage. A general discussion with practical illustrations of harvesting, de-budding, pruning, citing and commencement of digging trenches (fanya chini and fanya jju), fertilizer application, style of bending knee-high coffee trees among others.

Although the training seemed to be casual, participants drew enormous lessons as a deviation from their usual practices for example; using a hoe and spade to make holes instead of a huge stick that just compacts the soil and stunts the coffee seedling. Appropriate trench style; location and spacing depending on the intensity of water runoff for example one of the members said *" I did not know that digging of trenches follows the orientation of a slope, I thought that as long as I have a hole and soil heaped from any direction"*. The richness of picking red ripe berries instead of semi or green berries, the value of immediately and consistently sun drying after harvesting, the ability to visit and learn from others' fields among others as shared by some of the farmers. The participants were thereafter tasked to take on and put in practice the lessons learnt and through a rotational on farm training schedule, we would be able to monitor the progress of all the members within a produce organization.

Motivation

Maintaining the levels of energy and consistent participation from the large numbers (50-70) during situation analysis throughout implementation and reflection as the research cycle goes required plenty of techniques to be employed. Besides the collective visioning processes and consolidating the hope to achieve it, the lead researcher regularly contacted the participants through phone calls, text messages, emails, farm visits as extra mobilization strategies.

During training sessions therefore, we employed energizers to refresh the participants, had refreshments to boost morale and held interactive sessions during which each participant had a contribution to make. More to that was that some of the facilitators were financially appreciated at the end of the training sessions and the entire participants were kept in the know of the progress of research activities irrespective of present or in absentia.

4.2.2.2: Information dissemination techniques

We employed four basic forms of information dissemination although the reliability of information that may guarantee a technique effective as far as agricultural extension is concerned is the extent of adoption and evident practice. The use of mobile phones, written documents, radio and television programs and on the farm trainings in relation to access, availability and reliability were used and analyzed as elaborated below;

Mobile phones

During training sessions, four volunteers who possessed mobile phones were requested to move a distance away from the gathering. Four others from those that remained were given a similar message '' we shall have a meeting tomorrow at 2:00pm at the community hall'' that each would call and deliver to one of the other colleagues. On re-converging however, the messages they shared with the rest of the group were different from the original version that we could not stop laughing about the variety responses shared. Some of these responses did not have time, a venue and others could not differentiate whether the message called for a meeting of a training.

The implication was that mobile phones as a technique are available amongst the farmers and they could maintain them; farmers could easily access information through their mobile phones although in terms of reliability, they would only be reliable from a single source and for basic communications such as mobilization.

Written documents

Some few of the participants about 3-7 depending on the attendance recorded something in their own notebooks during trainings and workshops and about the same sample could ably read interpret and write especially in the local language. The company has documents in form of

profile, books, and information of flip chats from different trainings, registers, newspapers, banners and others with a lot of information on how to farm better but ironically, they are barely consulted to. For reliability purposes during trainings however, four words *''thank you so much for attending the training''* were written on various stick notes and given out to volunteers within the group to read aloud; the message was the same although some hardly read it.

With respect to the parameters of reliability therefore, there is wholesome information in writing since even the flip charts were being used for recording but majority of the farmers needed someone to help them utilize the information and that definitely renders the information un accessible for utilization.

Radio and television programs

As a way of mobilizing participants for mostly the workshops, we ran announcements over a local radio station (Tropical FM) and this was a preference by the board members but only to be surprised that majority of those that attended had not got the invitation through the radio announcement. One to one mobilization, mobile phone calls to the PO chairpersons and farm visits had made greater mobilization of the members.

About 1-3 of the participants owned a television and almost all owned a radio, and were even aware of agricultural programs aired on particular stations. They however could not re-run the programs, yet they at times missed out and those on radio were not visual thus less practical. This technique was rated unreliable because of its inconsistence in disseminating information.

On-farm trainings

Each produce organization (PO) meets at least once a month (see appendix 8 for the respective schedule). They meet mainly for trainings and, savings and credit meetings. Most of those who attend such trainings are usually the active members within the PO. The trainings we conducted hosted a range of 30-40 participants from various POs inclusive of children, youth, men and women. Company facilitators trained on management of coffee in the mother garden, the DAO handled harvesting and post-harvest handling procedures and the lead researcher facilitated the reliability of information dissemination techniques. Contributions from the rest of the participants were made at the end of each session and thereafter asked to list any lessons drawn during the training.

22 of the 30 participants that participated in the evaluation workshop ranked the technique as most reliable because it combined both communication and training, The trainings were practical, locally situated on volunteer hosts' field in each of the POs, inclusive, participatory, monitory and empowering.

Although on the farm trainings were ranked as the most effective technique by the participants, their sustainability and consistence requires facilitation for technical persons including the company facilitators to effect the program. "*The company is currently a non-profit making entity whereby its employees serve on a voluntary basis*" added the chairperson.

4.2.2.3: Collaborative rural development

With reflection on the principle of ''*learning as a matter of engagement*'' within the social learning theory, a heterogeneous stakeholder platform enhances greater learning opportunities within communities that share common goals to exploit existing niches and transform their wellbeing within society. This is because existing extension mechanisms position the farmers as target beneficiaries- who in that sense make a minimal contribution but are expected to achieve greatly through external facilitation.

With collaboration however, they were main stakeholders who spear headed the transformation process and, through a knowledge and cost sharing schedule, all the stakeholders performed their respective tasks to in order to have the model. The local leadership actively participated in sensitization about quality coffee production and; government representatives, and non-government personnel engaged actively in the mobilization of material resources as well as technical facilitations in the field. Farmers were not only participated in the research interventions but were also onboard to ably understand and lobby respectively for the company.

It is worth noting that one of the achievements that the collaborative research facilitated was the transition from Gayaza Coffee Growers Company to Gayaza Agali'awamu Cooperative society limited.

We therefore acknowledge that socio-economic rural challenges and needs may be easily addressed through collaborative and innovative strategies especially if they are locally visualized and initiated. This experience is based on the fact that collaboration during the research was a multi-sector avenue for knowledge creation and the linkages not only facilitated sharing but also

an array for implementation of short and long term interventions to address the main challenge of inadequate and inconsistent extension services.

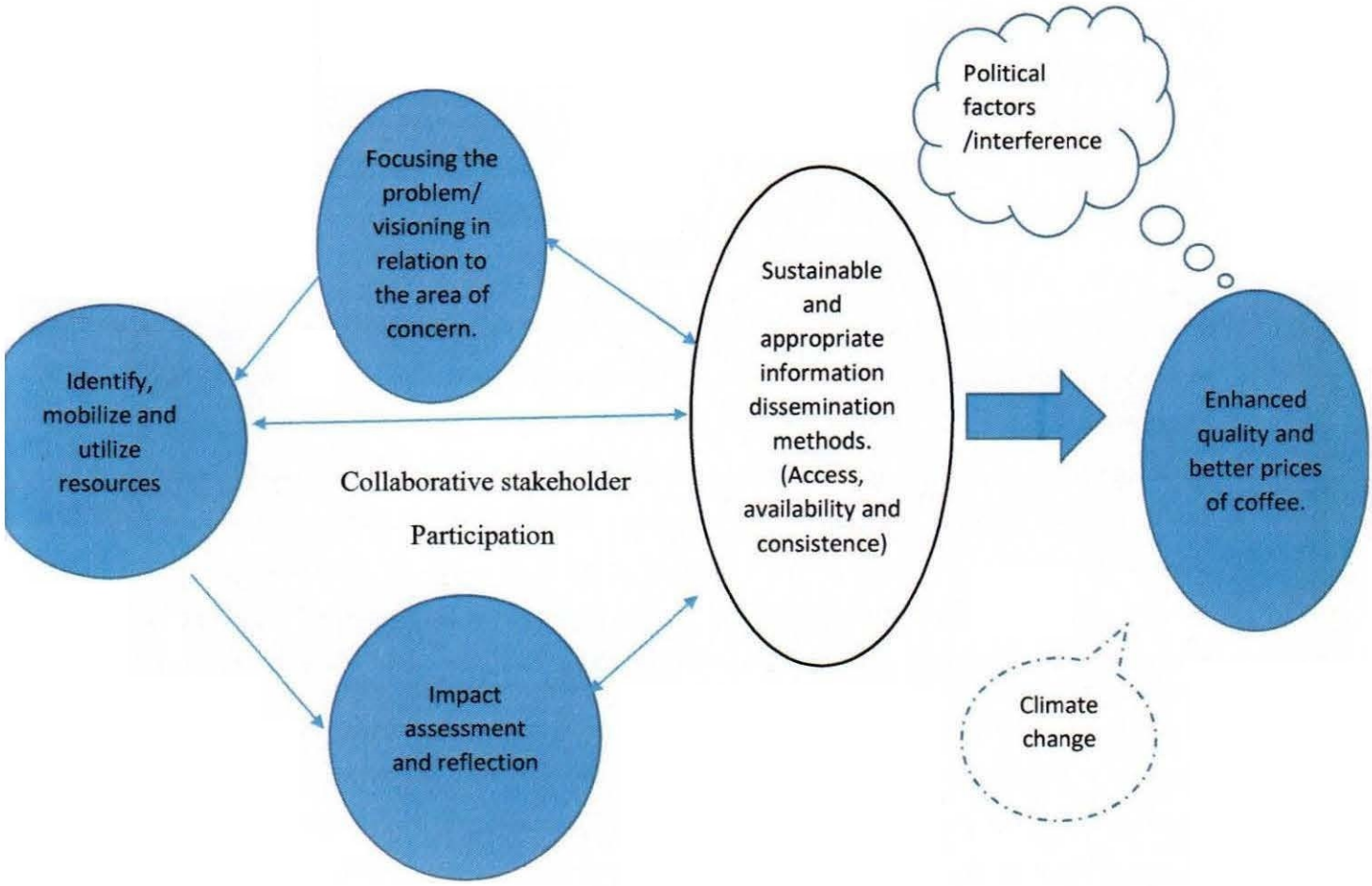


Figure 4.1. Graphical Illustration of Gayaza Agali awamu innovation systems model

The main problem that was prioritized was inadequate and inconsistent extension services. From the role play of the river code, the root causes were; inadequate facilitation for service providers, effects of weather and climate change and unfulfilled tasks by service providers. More to that were the limited number of extension staff, wide scope of coverage by the available staff, non- empowering methods of extension used, political interferences and inappropriate research methods. The manifested effects included exploitation of coffee farmers through lower prices, low economic standards, exploitation by middlemen, less competition on international markets, rural urban migration, poor quality of products and a general cycle of poverty.

Action points thus included short, medium and long term interventions that is on-farm trainings on quality control practices, initiation and processing of a coffee bi ll, selectively picking of only the ripe berries that are sorted and consistently dried on tarpaulin. Appropriate storage, sensitization workshops on quality control, establishment and enforcement of quality control by-laws and measures for income generation by the company. Refresher trainings to the company facilitators, the use of a moisture meter to ascertain dryness of coffee and design a mechanism of sustainably disseminating extension information for GCGC. This therefore called for identification and mobilization of resources that would be used in the implementation stage.

Therefore, participants through a brainstorming session mentioned resources that is agricultural facilitators and local leaders, land, the coffee alliance, infrastructure in terms of roads and the coffee store, possession of bicycles and motorcycles, mobile phones and access to credit facilities. Categorization of stakeholders and their roles was that, agricultural facilitators were responsible for extension education through practical on farm trainings, UCFA for market linkages and value addition, the farmers to participate in trainings and also put into action. All participants were responsible for monitoring and evaluation and those who had not been represented had to be contacted by respective messengers.

On farm trainings were conducted and organized at Produce Organization level, the use of mobile phones, written documents, radio and TV training programs were part of training sessions as a way of analyzing their contribution in delivering extension information. Harvesting of only ripe berries, consistently drying on tarpaulin and storage off the floor were also part of

the focus for training. Having put in place some of the interventions, there was need to assess their impact as well determine a cause for a re-planning phase incase need arose.

Furthermore, the implementation phase was followed by an evaluation workshop during which an analysis of the extent to which the interventions had addressed the needs was done. Knowledge of the activities conducted in designing the model and a ranking of the most reliable information dissemination technique that is on-farm trainings were the gist of the evaluation process. The other techniques that is mobile phones, written records, radio and TV programs complemented the dissemination process for sustainability. Well, the participants in the evaluation workshop acknowledged that the intervention had greatly impacted on information dissemination and since action research is cyclic, further reflections may arouse greater value addition in line with research and development.

In addition, the model further acknowledged extraneous factors especially climate change and political interference whose implications may be beyond the direct capacity of the stakeholders.

4.3: Determining the effectiveness of the model.

The determination took on an ongoing monitoring process and a general evaluation workshop at the end of the implementation phase. The evaluation specifically checked knowledge of the activities involved in designing and implementing the model and a ranking of the most reliable information dissemination technique. A pictorial narrative (see appendix 11) illustrating the various research activities and a questionnaire to which participants responded by voting during the evaluation workshop were used.

4.3.1: Knowledge of the activities

The tool designed to assess knowledge of the activities was used and it revealed that members could remember a role play of the river code, refer to the future workshop, the on-farm trainings and farm visits, and a sensitization workshop. Surely, those were the major activities through which the research was run and the pictorial narrative was simply an energizer and point of reference to illustrate that we had record of all that the research had undertaken.

Related to the above was that participants ably recalled how we come to single out inadequate and inconsistent extension services as the felt need *''we voted''* applauded the

members and as well acknowledged that we had identified the right challenge. The workshop was a success story during which stakeholders expressed gratitude towards the action research initiative in the presence of mentors from Kyambogo University. Here they acknowledged a complementary achievement to the innovation systems model that is the transition to company limited to Gayaza Agali awamu farmers' cooperative society.

4.3.2: Reliability of information dissemination techniques

Almost all the participants possessed a mobile phone but it was not ranked as most reliable because the information shared using the phone is inadequate. *"One cannot demonstrate for example selective picking but May only explain the characteristic of a berry that should be picked"* lamented one of the farmers. The phone is therefore reliable for consultation purposes bot not farmer training programs.

However, the greatest number of farmers who needed to use written information were illiterate sometimes to a level of not being able to write their names. T herefore, although information is wholesomely available in books, brochures and charts, it is not easily accessed by the majority illiterates and this renders the technique unreliable for extension information dissemination. Such information may however be made accessible in for a where technical persons directly interact with farmers to help them access and utilize such information.

Although television programs are both audio and visual in disseminating information, the irony is that not many of the farmers possessed a TV in their houses, yet those that did could not easily comply to the schedule when agricultural programs are aired. The radio only offers audio information and for both techniques, there is no direct interaction between the viewers or listeners for immediate feedback, hardly replayed and generally inconsistent.

More so, regular on-farm trainings are demonstrative, practical, monitory and may arouse collective action in case of need. They are enriching experience sharing avenues and therefore promote learning by doing through observation and reciprocation. The technique is most reliable although it is challenged by inadequate facilitation to enable facilitators sustainably conduct such monthly trainings amongst the eight produce organizations. *''With the transition to a cooperative however, the alliance may be capacitated to generate some funds to accomplish the routine''* said the chairperson.

4.4: Complexities

Harmonizing expectations amongst the stakeholders with regard to that the research could address was a challenging experience for example, there was a long debate on identifying the pressing problem as some members were frustrated with the manifested effects (low prices offered) other than acknowledging the root cause. More to that was that adding more value to the cherries as it is in the long run reduces the buyer's source of produce that they can only comply with better prices.

Just like any other research process, mobilization of all stakeholders to actively engage in the research interventions was a bit challenging especially the key informants arising from the multi-tasks they offer to different communities. Numerous motivation techniques were employed to address this such as, consistently reminding them about the value of the research on phone, email and radio announcements; farmer visits, refreshments during meetings and workshops, some allowances to the facilitators among others.

Majority of the participants in workshops and meetings were male and females were more available in the on-farm trainings and farm visits. Only two females are lead farmers, no female PO chairperson, and have a minimal representation on executive board. There was therefore need for more effort to reach out to such categories because we needed them for transformation.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

In this chapter, a justification of the research is further discussed in relation to existing practices from which we draw conclusions and later recommend with respect to the research findings. The research was guided by three objectives that is; to identify the main procedure of harvesting and post-harvesting coffee beans in Gayaza Coffee Growers, design and trio-test an innovation systems extension model and to determine effectiveness of the model.

5.1: Discussion

5.1.1: Harvesting and post-harvesting of coffee in GCGC

''Harvesting and post-harvest handling entirely depends on the information accessed by the farmer on how to go about the procedure'' said one of the PO chair persons.

The commonly used information dissemination techniques are mobile phones, written documents, radio and television broadcasts and on- farm training. Of all the above, the most reliable one tis on-farm trainings although it's still weak in implementation because of limited funds to facilitate technical persons even within the PO itself. The cherry that is ready for harvesting ripens by turning red, yellow when half ripe and blackish when over ripe (UCDA, 2014). There is typically two major harvests a year and other subsidiary harvests are usually done during the year around.

The practice is that harvesting coffee is manually done by selectively picking the fruit that has ripened off the branch as disseminated by existing the techniques. (How Coffee Works: Red Cherry to Green Bean.", 2006) Adds that selective picking of only the ripe fruits calls for consistent rhythms of harvesting since there will regularly be ready beans in the coffee field but also to maximize the amount of ripe coffee harvested.

During harvesting, farmers usually place sacks onto the floor onto which the harvested beans heaped and later transferred to collection baskets that are used to carry the beans home. While pi cking a nd before drying, a sorting procedure usu ally occurs where leaves, broken branches and undesirable beans are removed and thereafter, the beans are placed on tarpaulin to sun dry. clark(1999) Adds that processing must begin as quickly as possible to prevent fruit

spoilage and cherries should be raked and turned throughout the day, then covered at night or during rain to prevent them from getting wet. The recommended moisture content for dryness is 11% that is taken using a moisture meter and processing should be done as soon as the cherries have been harvested to maintain high quality beans. This information is available amongst the farmers accessed through fellow farmers, facilitations, and existing documents although the levels of practice deteriorate with frustration that stems from consistent low incomes even with greater efforts to produce quality coffee.

Information accessed about appropriate storage during and after harvesting, during drying and after drying because it greatly impacts on the quality of coffee is also available amongst the farmers. This was evident from the practices by some of the farmers who spread out freshly harvested coffee on tarpaulin or the cemented floor inside the store. *''The intension is to reduce fermentation and microbial activity that yield toxins and reduced sucrose hence lowering the quality''* said one of the facilitators. Subjecting the harvested coffee to sunshine immediately after harvesting further reduces the extent of microbial activity that leak out the glucose and also contaminate the coffee (GTZ, 2002). GCGC is comprised of eight produce organizations each with a chairperson and lead farmers. The common use of phones, written documents and broadcasts has however not been reliable as far as information dissemination is concerned because they are more of delivery than training techniques. Such a justification was enough to design and trial-test an innovation systems model for GCGC.

5.1.2: Design and implementation of the innovation systems model

This innovation systems model was based on iterative and interactive learning (Beshah, 2008), and efforts were made to include scientific theories and how they relate with the socio-economic characteristics of the people of GCGC.

In line with the above, Hall et al. (2007a) explains innovation capacity within a system as the skills, talents and knowledge held by individuals, organizations and institutions, patterns of interaction and policies developed, which enhances the knowledge processes – ranging from its generation to utilization.

Having analyzed the current situation, we focused the prioritized problem by synthesizing the root causes and well as the possible solutions and, with a collective vision, we further identified

and mobilized resources that would be provided by respective stakeholders. With such a platform, each stakeholder has a greater stake in ensuring that their role is accomplished as we aim to transform the situation because it taps into K.Balasubramanian(2002)'s characterization of marginalized communities in order to succeed in formal and informal learning environments:

- Varying levels of literacy and learning abilities might require facilitation of shared and horizontal learning;
- Lack of capacity to learn individually might require a focus on group and community learning needs;
- Lack of learners' ability to access information individually might require networking and sharing between those that have access and those that lack access;
- Language barriers might require the need for translation.

Furthermore, Joughin (2013) forwards that the rationale to why extension in Africa, and Uganda, has often not worked is the design/ mode of programs for effective extension service delivery, and the politics as to why and when agencies develop the capacity to design and implement policies that produce efficient outcomes. Agriculture extension thus is about acknowledging farmers as adult learners, learning as a mutual experience sharing process to which a flexible communication and Participatory environment enhances a transformative lesson. Engaging stakeholders in analyzing the root causes of their undesired situation and a transformative journey to a desired one is not only empowering but also sustainable because it combines local insights of community members with the technical expertise of researchers to explore mutual interests and issues (Chambers 1999; Gaventa 1988) through a democratic and collaborative exchange. (Percy 2005; Wing 1998). Röling and Pretty (1997) supplements that agricultural Extension educators must help farmers engage in learning, not just receive information (Franz, 2010).

The agricultural innovation systems investment sourcebook(2012),proposes agricultural research, extension, education and training as key components of an agricultural innovation system and the stages of the model clearly subscribe to the components as well as the four spheres that shape policy environment that is agricultural, infrastructural, science technology and innovation and education policies. The reality is rather complex Joughin (2013) because even

seemingly perfect designs that are politically supported from the outset come across obstacles during implementation (Thomas and Grindle, 1990) and since extension is one of the rare arenas where citizens meet government, it easily becomes politicized. We may therefore realize results when a right design is used in prioritized and implementable programs within in the specific political economic context because even the liberal models supported by donors and appear well thought through, may undermine the central agencies that used to be responsible for extension services (Mkandawire and Olukoshi, 2000; Odame and Oduori , 2013).

The common characteristics about the existing approaches is that they are majorly top down with emphasis on production and yet the producers aim at better prices to raise their incomes-the mismatch instead lowers productivity even with greater capacities and levels of investment in the non-priority sectors (Nkonya, 2009). For Uganda in particular, extension has evolved from the traditional supply driven model to demand driven, other pluralistic models from Non-governmental organizations, National Agricultural advisory services (NAADS) prosperity for all to the current operation wealth creation. The pearl of Africa, with 68% of its population earning from subsistence agriculture cannot raise food enough for its population within a current dilemma of political insurgence and a debate on whether extension has transformed from learning how to farm better to the provision of inputs.

On the other hand, agriculture extension calls for effective communication and action to enhance learning and adaptation. The research thus adopted a variety of information dissemination methods that is written documents, the use of mobile phones, radio and television programs, as well as on the farm trainings to share and learn about appropriate harvesting and post-harvesting procedures. Transformative learning therefore calls for agricultural educators to tap into capacities of the local communities and the technological drive to appropriately share and disseminate extension information and practices with stakeholders' collaborative action for its not only about farming but general rural development.

One of the philosophies of extension is that it should provide capacity for one to learn by doing and learning is reflected as knowledge in practice (My agriculture information bank).With the existing extension approaches together with regular rebranding, consistency in adoption levels has not yet been realized. The philosophy is however short of how transformative learning can be facilitated and that is why technical persons fail to acknowledge co-learning sessions and

instead organize teaching sessions that do not guarantee learning. The methods and tools employed during situation analysis and the implementation phase were actively engaging and participatory that every participant felt they had had a contribution to make towards a sustainable transformation.

In line with the above, Tracy(2000) from a positive standpoint acknowledges that, "*collaboration enables society to draw on the creative energies and human and financial resources of all sectors, bringing them together to benefit communities and the nation.*"

For a company like GCGC that has existed for over fifteen years under a depot committee and produce organizations; with resource persons that is facilitators and lead farmers but has not realized its objectives, a broader societal base was inevitable in realizing our transformation. The model is actually a multi-stakeholder framework that can be adopted by any other organization with special focus on their objectives in order to achieve their goal.

However, Brownson (2012) defines information Dissemination as a science that deals with the study of how evidence-based practices, programs, and policies can best be communicated amongst different stakeholders within a society of potential adopters and implementers to produce take up and effective use. According to the model, reliable information dissemination techniques are characterized by timely access to available information and consistency of information flow amongst the participants. Implementation and adoption take on accomplishments of tasks within the work plan and evaluation as an ongoing process of reflection on the socio-economic impact created by the interventions. In line with the latter therefore, Borras(2016) forwards two dimensions evaluations that is; Permanence in terms of regularity of occurrence and organizational responsibility that monitors level of sustainability of the interventions.

In order to design the innovation systems model, we based on existing extension theories and approaches, the philosophy of sustainable information dissemination and the principles of collaborative rural development. We however acknowledge that for GCGC, traditional extension practices had not been effective at teaching and learning for adoption but rather a collaborative approach of valuing participants as co-resource personnel rather than target beneficiaries. From

the discussion above, a sustainable information dissemination method is one that ensures access, availability and consistence of information.

5.1.3 Effectiveness of the model

Determining the effectiveness of the model involved an analysis of the activities conducted during its development and implementation with respect to their outcomes as indicators to a quality innovation (Haner, 2002) as presented below.

5.1.3.1: Visioning in relation to the problem

At this stage our focus was to single out the pressing problem and underlying factors and together with a SWOT analysis as a baseline for transformation. Inadequate and inconsistent extension services was the prioritized problem, energetic farmers, possession of land, favorable political climate, existing coffee fields, group cohesion and extension service providers as strengths. Weaknesses included lower value produce, high costs of inputs and limited markets whereas the opportunities were the alliance, existing extension programs and development partners. General climate change, pest and disease outbreaks as threats were the existing threats to productivity. We thus acknowledge that the accomplishment was effective especially after the employment of methods and tools that ably facilitated a situation analysis.

5.1.3.2: Identification, mobilization of resources

We mostly intended to have resource persons on board who would within the capacity of their categories facilitate mobilization of material resources, engage in sensitization workshops and also facilitate trainings to accomplish the tasks as per the work plan.

Extension facilitators coordinated the research interventions by mobilizing for training materials and logistics and organizing on the farm trainings.

Farmers provided fields for training, actively participated and drew practical lessons, spearheaded patent resolutions during meetings.

Representatives from Uganda coffee farmers' alliance were key informants and further facilitated a transformation from company to cooperative.

Local leaders were not only active participants in training activities and meetings but also conducted sensitization schedules for the research programs.

With some inconsistencies in attendance by some participants however, those present were representative enough to take on and ably accomplish the tasks

5.1.3.3: Impact assessment and reflection

The outcome was that participants ably identified activities conducted during the research.

On the farm trainings were ranked as the most reliable information dissemination technique because they were both a disseminative and learning avenue.

An innovation systems was model designed and implemented and evaluated just like the action research spiral goes.

Formally Gayaza coffee growers' company limited transformed to Agali'awamu farmers' cooperative society.

Since action research cyclic, procedures at the different stages may be done differently with other consistent planning and reflection stages or even employ different tools to realize different goals with regard to stakeholder's interests.

5.1.3.4: Sustainable information dissemination techniques

On the farm trainings were ranked as the most reliable technique because they are a rich learning avenue through practical demonstration and experience sharing.

Mobile phones availed inadequate information although almost all the participants possessed at least a phone.

Written documents availed reliable information that was not easily accessible because of greater illiteracy levels amongst the participants.

Radio and television programs availed inconsistent information and whereas majority of the participants didn't own a television, radio broadcasts were barely technical.

The methods were later evaluated to analyze the most effective one in terms of reliability and that was on-farm trainings-voted by 22 out of the 30 participants that engaged in the evaluation workshop.

Generally, the model is effective because the recorded outcomes are in synchrony with the expected outcomes. This is because physical and felt outcomes of the research interventions are reflected in Kirkpatrick's four levels of measuring effectiveness (Kamath, 2017) that is;

Level 1: reaction, as reflected in the transformation from a company to a cooperative.

Level 2: learning, evidenced by the lessons drawn by participants during on-farm trainings and the innovation systems model.

Level 3: behavior, further reflected in accomplishment, the commitment and acknowledgment by the participants regarding the research interventions.

Level 4: results as presented in chapter four.

In line with the outcomes, (Jeerapandh, 1963) acknowledges three principles in the communication theory that is audience, channel and treatment of information; with research and development therefore, strengthening the potential within group activities as a means to reach out to the wider community catalyzes the transformation process

5.2: Conclusion

The members of GCGC Selectively pick ripe coffee cherries and this is the most recommended method of harvesting because it allows opportunity for the green ones to mature effectively by minimizing wastage and also offers maximum output per tree through the simultaneous harvests during the season. It is however labour intensive thus requires greater commitment and consistency. Access to such information has always been through the regular extension approaches.

The innovation systems model designed is a multi-sector framework that can be adopted by a diversity of institutions in pursuit of their respective goals. It was designed with a reflection on existing extension approaches, philosophies of sustainable information dissemination and the social learning theory – with special focus on collaborative rural development amongst small holder farmers.

The model is effective especially on grounds that Gayaza coffee growers transformed to Gayaza Agali awamu farmers' cooperative society. The transition comes with greater opportunities for resource mobilization for instance through shareholding, value addition, and broader marketing linkages.

5.3: Recommendations

Since selective picking is the most recommended harvesting technique, it should be upheld by even hiring casual laborers to assist in maintaining such quality. More moisture meters should be equipped to the equipment section and other managers hired since the transition comes with greater opportunities and value addition. The cooperative should maintain worthwhile coffee prices not only to motivate members but also sustain the quality as advanced.

There is need to acknowledge the fact that farmers need extension and education services to transform the chain of agricultural production but not the inputs supply syndrome. This is possible if target populations spearhead development interventions to ensure sustainability and; such populations should be regarded as partners rather than merely beneficiaries because then they'll be co-contributors to the transition. . Technical persons should acknowledge farmers as adult learners who also have a contribution to make towards rural development because learning is a mutual experience sharing process to which flexible communication and participatory environment enhances a transformative lesson.

We recommend that the model be further tested with other farmer organizations because, basing on the fact that it was an action research, more cycles of the research in form of pilot cases would even better effect the model since they add value through consistent rhythms of reflection and re-planning.

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Appendices

Appendix 1:

The proposed interventions as per the future workshop held on 15th December 2016.

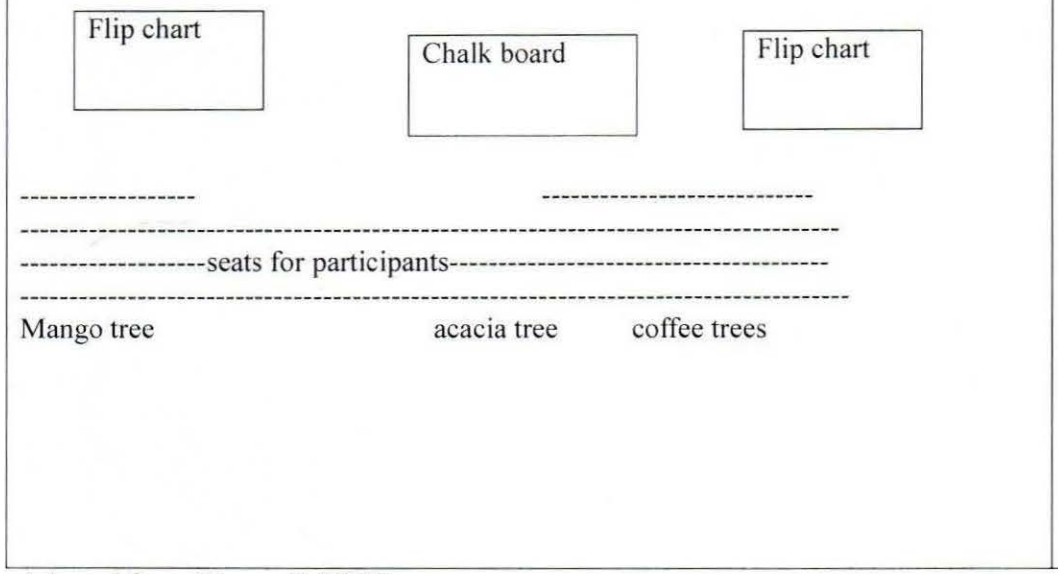
Suggested solutions	**Category**	**Responsible stake holders.**
Village trainings on quality control practices	Short term	DAO, L/R, local leaders.
A coffee bill to be initiated and processed	Long term	DAO
We pick only the ripe berries	Short term	Farmers
We dry the coffee consistently and using tarpaulin	Short term	Farmers
We store coffee in sisal bags, on floors with pallets and stacks.	Short term	Farmers, company management.
The production department to partner with enforcement team at the district to sensitize farmers on coffee quality control	Short term	DAO
Establishment of coffee quality control by laws	Short term	LC1 chairpersons, political leaders, DAO
Offer respective training to company facilitators	Medium	DAO, LR
Devise means of generating income for the company to facilitate its activities/ operational costs e.g., a there is a proposed deduction off members' sales to be approved by the members.	Medium	Company management, farmers, LR, DAO.
Use of a moisture meter to inspect for coffee moisture and sample huller	Short term	Company man agent, farmers
Devise mechanism of delivering reliable extension information	Medium	All stakeholders

Key: Short term is within a period of three months. Medium is above three months but not above six months: Long term goes for above six months.

Appendix 2: An observational protocol for the future workshop held on 15th December 2016.

Length of activity – 180 minutes.	
Descriptive notes	**Reflective notes**
Area of concern: experiences, practices and challenges of harvesting and post-harvest handling of coffee	Could this address the root cause of the problem!
Facilitator welcomes the participants, explains the rules for the workshop and pins them up for reflection, flip charts and chalkboard placed against the wall and two rapporteurs for the session	Am not sure this was a conducive environment for the workshop.- by the roadside, under trees, convenience!
Participants seated on benches in a semi-circular form facing the wall, actively contribute, seem to be enjoying the session from the active engagement and small discussions they hold.	I wonder if the flip charts are not tiny for the bigger crowd!
Challenges are categorized and ranked by voting, possible short and long term interventions are suggested with respect to the stakeholders responsible.	The facilitator and participants seem to have a good rapport, judging from the humorous discussion and active engagement.

A sketch of the setting



Adopted from (Creswell, 2007)

Appendix 3

Work process analysis tool

STAKEHOLDERS' WORK PROSESS ANALYSIS TOOL: GAYAZA COFFEE GROWERS- MUBENDE.

Kindly respond to the following questions.

1. What are the main steps involved in coffee production and marketing?
2. Identify the activities undertaken in each of the steps.
3. What tools and equipment are required to accomplish each of the steps?
4. Define the competencies required to effectively accomplish each step.
5. Identify the gaps/limitations encountered at each of the steps.

Appendix 4: General work plan

Month	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Activities															
	Situation analysis			Proposal writing and defense		Submission of proposal Implementation of research interventions			Evaluation in relation to research objectives	Thesis writing and mini oral presentations			Submission of thesis	Viva and final submission	Graduation

Appendix 6: The observational checklist.

	Produce organizations (PO)				**Number of households visited**	**Remarks**
Parameters	Kya muguma	Kyejunga	Kyewanise central	Kyewanise west	Records were taken from at least four households of those visited per PO	
Picking of ripe berries						Good
Harvesting off bare ground						Very good
Sorting of coffee						Very good
Drying off bare ground						Very good
Appropriate storage						Good
Regularity of farm trainings						Weak

Appendix 7: Work process analysis for Gayaza Coffee Growers

	Step 1: Membership	**Step 2:** Sourcing for planting material	**Step 3**: Coffee management in the garden	**Step 4:** harvesting and post-harvest handling
Requirements, materials and equipment	Membership fee of 10000/= A coffee farmer	• Group membership • Appropriate information in a requisition form • Prepared mother garden for the seedlings	• Hand hoes • Slashers • Pesticides • Watering cans • Fertilizers • Pair of scissors • saws	• Tarpaulin • Sisal bags • Wooden Pallets • Weighing scales • Sample hullers • Moisture meters • Screening sieves • Sample scales
Work procedure	Aspirants fill membership forms	• Identification of donations for planting material. • Land preparation • (Digging of holes) • Filling of requisition forms • Receiving and signing for the seedlings	• Weeding • Fertilizer and pesticide application • Water harvesting techniques in the garden • Planting trees for shade/mulch • Trimming coffee trees • Bending the branches for easy harvesting	• Picking red ripe coffee beans • Sun drying the coffee beans • Storing the beans • Quality control-hygiene and moisture c
Competencies required	Commitment Regular attendance for company activities Regular coffee sales to the company	• Ability to read and write	• Commitment • Knowledge of the right planting techniques • Knowledge of the right intercrops • Knowledge of a diversity of water harvesting techniques	• Ability to identify and pick only the ri • Ability` to consistently use tarpaulin f • Ability to maintain a hygienic store wi • Ability to effectively use the equipmei

			• Appropriate trimming and bending skills	
Gaps /limitations	Less commitment	• Poor quality planting material • Bureaucratic procedures • Receiving less than requested for	• Expensive inputs • Fake inputs on the market • Unpredictable weather conditions • Limited number of farm trainings	• Theft • Poor quality coffee due to drying on th harvesting unripe beans, drought, pest and disease infestation • Limited practical trainings on harvesti • Middle men create un healthy competi • Influ

			• Appropriate trimming and bending skills	
Gaps /limitations	Less commitment	• Poor quality planting material • Bureaucratic procedures • Receiving less than requested for	• Expensive inputs • Fake inputs on the market • Unpredictable weather conditions • Limited number of farm trainings	• Theft • Poor quality coffee due to drying on th harvesting unripe beans, drought, pest and disease infestation • Limited practical trainings on harvesti • Middle men create un healthy competi • Influ

Appendix 8: Produce organizations and their schedule

S/N	Name of produce organization	Monthly field training date	PO chairperson	Sex	Contact
1	Kyewanise west	Last Thursday of a month	Jemima Baguma	Female	0789678911
2	Kyewanise central	Wednesday- 2nd week of a month	Aaron kizza	Male	0774821742
3	Kyamuguma	Last Sunday of a month	Bisanga Laurence	Male	0775330970
4	Gayaza	20th every month	Mutungwanda Sam	Male	0782502366
5	Kyejunga	30th every month	Tomusange w	Male	0782853212
6	Kalagala	1st Tuesday	Ssentongo Grazio	male	0783838419
7	Kyamukoona south	1st Thursday of every month	Ahimbisibwe David	Male	0755950680
8	Kalingo	Every last Sunday of a month	Ssemakula Titus	Male	0753266602

Appendix 9: The evaluation guide;

1. What was the area of concern identified during the situation analysis?

   ''The harvesting and post-harvest handling stage''

2. How did we arrive at the most pressing problem identified

   By voting the four main categories of problems

How do you receive extension information

Through;

i. Mobile phones
ii. Written documents
iii. Radio and TV programs
iv. On farm trainings
v. Others (specify), one to one.

3. How would you rate the various information dissemination techniques in terms of reliability?

Method	**1**	**2**	**3**	**4**	**5**	**Total number of votes**	**Reasons**
Mobile phones		/////////				4	''Although we have the phones, information shared is inadequate''.
Written documents				//////////		3	Information is available although may not easily be read and understood
Radio and television programs				//////////		3	Not many members have television, radio programs are not demonstrative.
On farm trainings	/////////					22	Are demonstrative, practical, monitory, may arouse collective action in case of need, they are enriching experience sharing avenues, learning by doing and observation.

Key;

1. Strongly agree
2. Agree
3. not sure
4. disagree
5. strongly disagree

Appendix 10

Table 9: An analysis of the effectiveness of information dissemination techniques

Technique	**Description of parameters**	**How it was used to analyze effectiveness**
Mobile phones	**Availability**: possession of a mobile phone and the ability to maintain it.	Basic communications and mobilization, During training sessions, four volunteers each called a colleague from a distance and conveyed a similar message; on re-converging however, the messages they shared with the group were different from the original version, The volunteers were those who had airtime on phones, 95% of the participants possessed a mobile phone
	Access: ability to reach the service providers through the mobile phone	
	Reliability: how much information is given /received on the phone	
Written documents	(**Availability**)Possession of a logbook or any written information	20% recorded something on paper during the sessions, 30% could ably read interpret and write especially in the local language, During the training, four words (thank you so much) were written on various stick notes and given out to volunteers within the group to read aloud; the message was the same although some hardly read it.
	(**Access)**Ability to read, interpret and write.	
	(**Reliability**)How often one uses/ reviews on the documents and feedback in need of clarification	
Radio and television programs	(**Availability**)Ability to own and maintain one	10% of the participants owned a television and 70% a radio and were even aware of agricultural programs aired on particular stations,
	(**Access**)Knowledge of which channels and when agricultural	

	programs are aired	They however could not re-run the programs, yet they at times missed out and those on radio were not visual thus less practical.
	(**Reliability**)Ability to tune in, re-run or even refer to the programs after they have been aired	
On-farm trainings	(**Availability**)Existence and frequency of an on farm training program	Each produce organization(PO) meets at least once a month, They meet for trainings, savings and credit, and other occasions, Participants are usually the active members within the PO, The trainings we conducted hosted a range of 30-40 participants from various POs inclusive of children, youth, men and women, The trainings were practical, locally situated, inclusive, participatory, monitory and empowering.
	(**Access**)Ability to host, proximity to the training site and duration of training	
	(**Reliability**)Ones' level of participation in on farm training session determines how they benefit	

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FACULTY OF VOCATIONAL STUDIES
DEPARTMENT OF ART & INDUSTRIAL DESIGN
MASTERS IN VOCATIONAL PEDAGOGY PROGRAMME

28th September, 2016

To; GAYAZA COFFEE GROWERS' COMPANY LIMITED

.....

RE: INTRODUCTION OF NYAKYANZI SAIDAH

This comes to introduce to you **NYAKYANZI Saidah** a student of Masters in Vocational Pedagogy (MVP) Programme at Kyambogo University. This student bears registration no. 15/U/14588/GMVP/PE and in her final year. As a requirement for graduation, this student is expected to carry out Action Research through a collaborative process with World of Work.

Any support rendered to her is highly appreciated.

Looking forward to your usual support.

Yours Sincerely,

Chris Serwaniko
Project Coordinator, NORHED MVP Program
Masters in Vocational Pedagogy Program

Attendance list of members for co operative

ATTENDANCE LIST

Venue Community Centre **Date** 18/03/2017

Activity Training & workshop

Name	Sex	Designation and PO	Acreage for coffee	Maximum yield so far	Contact	Sign
Mganda Robert	male	c/person comp	5 Acres	800 kgs	0705766603	
Kabegumba Alex	M	Sec: Farmware	1½	180 Kgs.	0784697892	
Luwaggga Javiro	m	c/p Business	1½	390	0773258904	
ATHIMBI STEWE DAVID	M	Sec. Business	1 Acre	600=	0755950680	
Kayiito IBURAHI	M	Membara	1 Acre	500/=	0753305856	
Kamugisha Alfonso	M	V.C/P. Business	1 Acre	170	0758168684	
Kayonde Pauwa	M	member P.O	¼ Acre	50	0771437833	K. P
Akimbisimbwe Elida	M	c/m cleosprinsky	4 years	22350kgs	0753856656	
Ssemwogerere charles	M	L/F	2. Acre	300Kgs.	0778008166	
Monday Thomas	M	Member	3 Acres	600kg.	0788342592	
BAZIRA SALAPIO	M	Member	2 acres	300 kg.	0779858154	
Tumusabe Jadeo	M	Member	1½	150 kg	0779638657	
Barnabo Alfonso	M	member	3	1800 Kg.	0758947653	
Lubega Bony	M	Leadfarmer	½	100 kg.	0781988757	
Tomusange William	M	Member	2	150	0782855812	
SSEMAKULA TITUS	M	L/FARMER & Demonstrator	4 Acres	15 bags	0753266602	
Mugerwa Joseph	M	Vice-Chairman	4 Acres	12 Bags.	0751545450	
Kaggwa Samuel	M	Member	½ acre	70 kg	0776463453	
Kabuwo Lateefi	F	member	¼ acre	10 kg	(Non-Cooperative)	
LUBBA Bonny	M	Facilitator	2 Acres	70 kg	0789836023	
SABITI RICHARD	M.	Co-Manager. Secretary	1 Acre	300/=	0703227719	
NAKYANZI SARAH	F	Agric officer	N/A	N/A	0703339790	
Sebugwaawo. George	M	Agric officer	N/A	N/A	0772392474	

ATTENDANCE LIST

Venue GAYAZA COMMUNITY CENTRE Date 22nd Mar 2017

Activity CONSULTATIVE MEETING ABOUT THE TRANSITION FROM COMPANY TO COOPE

Name	Sex	Designation and PO	Acreage for coffee	Maximum yield so far	Contact	Sign
Luwagga Javiira	m	Leadfamer	2:Acre	390 kg	0773258904	
munyiragwe E	M	member	1/4 Acre	200 kg	0784323544	
Nankindu Justine	F	member			0773737370	
Kamulasi John	m	Membal	1/4	300 Kg	0787229191	
SSENTONGO.G.salongo	m.	Clayimani P.O	yika.6.	1800/kg	0783838419	S.G.S.
Nizeyi Gerald			2. ACres	400 Kg	0782223014	
Nakyeyune A.	F		6. ACres	1000 kg.		
Akum Nuwagaba	m	member	1/4	50 kg.	0788646461	
Salongo Selejiyra	m	Membe	1/4		0705230313	
Moz ramuren	m	member	yuka(2)	600/=		
Ahimbisibwe Eliab	m	CBO disipritaly	yuka(4)	2200kg.	0753859666	
Kyomugisa Jadupirini	F	member	yuka (6)	2800 kg.	—	
Tumukunde Gerazio	M	Famer	1/2 hika	100kg	0759130167	
Tumukunde Gerazio	m	member	1/2 hika	200kg	—	
Ahimbisibwe David	M	sec. Bussines	2 ACres	600kgs	0755950650	
Buyondo God	m	Sec. Kalagala HCI	1/2 ACres		0751032516	
Habiimana.S	M	member	1 1/2 Acres	400KGS	0789367821	Habiima
SSebudde St	m	member	4 Acres	800kgs	0759429566	
Muyo tofen	m	member	2 ACres	—	0701211756	
Muhumuza	m	Member	1/4 ACres	—	0750687974	
LUBBA Sonny	m	Famicilitator	2 ACres	220	0789836023	
sebugwawo George	m	AGRIC OFFICER	2	1200kg	0772392474	
Mohammed Kasumba	m					M.K.

ATTENDANCE LIST

Venue GAYAZA COMMUNITY CENTRE Date 27th Mar 2017

Activity CONSULTATIVE MEETING ABOUT THE TRANSITION FROM Company TO Coope

Name	Sex	Designation and PO	Acreage for coffee	Maximum yield so far	Contact	Sign
Luwagga Javiira	m	Lead Famer	2:Acre	390 kg	077325890[illegible]	[illegible]
munyiragwe E	M	member	1/4 Acre	200 kg	0784327[illegible]	[illegible]
Nankindu Justine	F	member			077373737[illegible]	Nankindu
Kamulasi John	m	Membal	1/4	300 Kg	078722999[illegible]	Kamulas
SSENTONGO.G.salongo	m.	Clayimani P.O	yika.6.	1800+kg	0783838419	S.G.S.
Nizeyi Gerald			2. ACres	400 Kg	0782223014	Gerald
Nakyeyune A.	F		6. ACres	1000 Kg.		Nakyeyune
Akum Muwagaba	M	member	1/4	50 Kg.	0788[illegible]	[illegible]
Salongo Selesiyo	m	Membe	1/4		070 5230313	Selesiyo
Nsoz Rawuzeo	m	member	yuka(2)	600+		Rawuzeo
Akimbisibwe Eliabu	m	CBO disipriraly	yuka(4)	2200kg.	0753859666	[illegible]
Kyomugisa Jeduprini	F	member	yuka(4)	2800 Kg.	—	Kyomugis
Tumukunde Gerevasio	M	Famer	1/2 hika	100kg	0759130167	[illegible]
Tumukunde Gerevasio	m	member	1/2 hika	200kg	- - -	[illegible]
Akimbisibwe David	M	Sec. Bussines	2 Acres	600kgs	0755950650	[illegible]
Buyondo God	m	Sec. Kalagala HCI	1/2 Acres		0751032516	[illegible]
Habiimana.S	M	member	1 1/2 Acres	1400kgs	0789367821	Habiim
SSebudde ST	m	member	4 Acres	800kgs	0759429566	[illegible]
Nyo tarden	m	member	2 Acres	—	0701211756	[illegible]
Muhumuza	m	member	1/4 Acres	—	07506879[illegible]	[illegible]
LUBBA Bonny	m	Facilitator	2 Acres	220	0789836023	[illegible]
sebugwaawo George	m	AGRIC OFFICER	2	1200kg	0772392[illegible]	[illegible]
Mohammed Kasumba	M					M.K.

GAYAZA COFFEE GROWER,

POBOX 48 MUBENDE.

DATE 6th June 20 12

PARTICIPANTS ATTENDENCE FORM FOR THE FUTURE WORKSHOP (EVALUATION WORKSHOP)

S/N	NAME	SEX	DESIGNATION	CONTACT	SIGN
1	MANZI BRIAN	M	Community Facil	0788324278	
2	MUSIIME LENARD 0701536677	M.	Agric culture offic	0775536673	
3	KIJJERI JOSEPH · SALONGO	m	Treasurer	0702390715	
4	Kabugho Jeniima	F		0789678911	K.J
5	SSEMATTA christopher	M	Kyejjunga	0706195401	SSEMATTA C.
6	BWAMBALE WILSON	M	KYEWANISE	0777587571	
7	Kwanuka J.	M	Kyejjunga	-	
8	Ahimbisibwe David	m	Sec. Business	0755950	
9	Monday Thomas.	M	Kyewanise ·	0788342592	Monday
10.	Tumusabe Tadeo	M	Kyewanise	0779638	
11	Mohammed Kasumba	M.		0782626853 0700401173	M.K.
12	Lubega Bony	M	Kyewanise C.	0781988757	
13	Mbazira Fati	M	KYEJJUNGA		Fati
14	Barimabo Africano	M.	Kalagala Kyengera	0758947653	A/B.
15	Bakuru mpagi	M.	Kalagala Kyengera		BKL.
16	SSemutima Ernest	M	Kyejjunga	0777291767	
17	KIZZA Alson	M	KYEWANISE	0774821742	
18	Tomusange wilson.	M	Kyejjunga	0782853212	
19	Kwihangana Hestori	M	Kyamuguma	0755020	
20	Maate Ossia	M	Kayunga		M K.
21	Ndagire AYISA	F	Kyejjunga	0778164680	—
22	Kayito IBURAH	F	Kyejjunga	0753305	
23	Mugerwa Joseph	M	Kyamuguma	0751545450	Mugerwa.
24	Ssenyonga John	M	Kyewanise Centre	0777181758	
25	SABITI RICHARD.	M.	Co-manager	0755078412	

ATTENDANCE LIST

Venue GAYAZA **Date.** 06/06/2017

Activity..... EVALUATION WORKSHOP .....

Name	Sex	Designation and PO	Acreage for coffee	Maximum yield so far	Contact	Sign
Christopher Serwanika	M	Kyambogo University			0751500815	
Robert Mulebeke	M	Kyambogo Univ.			0702517024	
Salongo SSENTONGO	M.	Kalagala P.O			0783838419	S.S.S.
Ssabudde S.A	M.	Kalagala P.O			0759429566	

GAYAZA COFFEE GROWERS COMPANY LIMITED,

POBOX 48 MUBENDE.

DATE 18/10/2016

PARTICIPANTS ATTENDENCE FORM FOR THE FUTURE WORKSHOP

S/N	NAME	SEX	DESIGNATION	CONTACT	SIGN
1	Kizza Abdu	M	Kyenga 1 G	Jom 0772821742	
2	Penwlo Kyondo	M	Kyeringenya	I-Com	Penwlo
3	Byakatonda Charles	M	Kyamugema	0773 8275	
4	Ruberwara Runeth	M	Nyenguma	Fenna 0785555474	Runeth
5	Tamusawi Wini	M	Kisiharwa	Fenna 0782553212	
6	Nabukime Elisa	F	Kisiwula		Nabukime
7	Ndagire Aisha	F	Kisiwula	0778164468	Ndagire
8	Sabiiti Richard	M.	Co. Manager	0703277719/0782018	
9	Kizza Joseph	M	Treasurer	0702390715	
10	Kaggwa Samuel	M	Kyewanise	0776463433	
11	Tirukwenderera	M	Kyamugema	0787494093	
12	Muwagga J	M	C/M Business	0773258904	
13	Mukyeruwa	M.	Peruna	0750594230	
14	Munyaneza Ivan	M	Farmer	0782078443	
15	MUTUNGWANDA S.	M	FARMER	0782502366	M. S.
16	Lubega Bony	M.	Lead farmer	0781988757	
17	MATIE KOSEYA	M	FARMER	-	M. K.
18	SSENYONGA JOHN	M	Secretary Co.	0777181758	
19	Mugerwa Joseph	M	Vice C/P	0787209881	
20	Kamugisha AF	M	Vice Business	0783239519	
21	Muhumuza M.	M	Youth C/P	0755020388	
22	Achom Agnes	F	Kyewanise	0706177158	
23	Nakiyingi Betty	F	Kyewanise	0785498025	
24	ATHUMANI STEVEN	M	Sec. Business	0755950680	
25	Lugonvu James	M	Facilitator	0785051450	

GAYAZA COFFEE GROWERS COMPANY LIMITED,

POBOX 48 MUBENDE.

DATE 18/10/2016

PARTICIPANTS ATTENDENCE FORM FOR THE FUTURE WORKSHOP

S/N	NAME	SEX	DESIGNATION	CONTACT	SIGN
26	Mbonye C.		Cadley		
27	Bwambale		~~fo~~.	0751108001	
28	Kule Mucunda		Kyewanise	-	K.M
29	Kabugho Jemimah		Kyenisi wesie	0789678911	K. J.
30	Kyakimu maryamu		Kyewonise	0774445942	K.M
31	NAKAFERO F.		Gayaza		
32	Maliza Rosa		"		
33	Nabawanuka M.		Kyamuguma	070 6023459	
34	Kawalya Tom		Kayunga.	0784425944	
35	Nambusi 1.		Gayaza		Nambusi
36	Raheri Kabugho		Kyawanise		R.K.
37	Tumusime K.		Kyawanise	0774066506	T.K.
38	BAZIRA SALAPIO	M	Member	0704828632	
39	Ssemalula Isha	M	Member	0753266602	
40	Kyamanywa		Kyamukona	0775665207	
41	Nalise Kabuzale				
42	NOAMI ye OAV	M	Kyewanise	0782349650	
43	HAKIZAN: JOHN	M	Kyamu Guma	0783479443	
44	Kasumba Edward	M	Kyewanise C.	0787841665	K.E.
45	MWENGE BENSON	M	Gayaza	0701210949	
46	KAYIWA PATRICK		KYEKIANISE	0756642838	KAYIWA
47	Monday Tomasi	M	Member.	0788342542.	Monda
48	Bwambale Zulibamu	M	Kyewanise		
49.	S. Kitone	M.	Kyewanise	0777306360	

GAYAZA COFFEE GROWER,

POBOX 48 MUBENDE.

DATE 15/12/2

PARTICIPANTS ATTENDENCE FORM FOR THE FUTURE WORKSHOP

S/N	NAME	SEX	DESIGNATION	CONTACT	SIGN
1	Sebuguzawo George	M	Agric officer	0772392474	
2-	NDAMUYE DAVID	M	Member	0782349650	
3-	Klasswa Charles	M	member	0700079633	
4-	LUBEGA Bonny	M	Facilitator	0789836023	
5-	Tomusenge .W.	M	W	0782853282	
6-	Kaggwa Samuel	M	Member	0776463455	
7-	Kitone Ssebaddukka	M.	V.Chairman Kyewanika	777306360	
8-	Kisembo sun Francis	M	Mutuze		
9-	Mizingo CHRISTOPHER	M	Mutuze	—	
10	Kizza Moses	M	Member	0774982174	
11	SSEMAKULA TITUS	M	Demonstrator	0753266602	
12-	Kajoto IBURAA	M	member	0753305	
13	SSEMATH christopher	M.	member	0783707765	
14	MUJUNGWANDA SAM	M	member	0789502366	
15/	Kisembo Muhamudu	M	member	0772085	
16	Mbonimpa Nelson	M	Mfomation	0706266583	
17	Ssekyanzi JOSEPH	M	DCP student	0703216862	
18	Joyce SSemaguler	F		0771449217	
19	Lakeh Kabuubha	F	Farmer	—	
20	Ditah mwine	F	member	-	
21	Kabanyanda Josephine	F	member	-	
22	Fiona Nambooze	F	member	-	
23	kaggwa Jackson	M	member	-	
24	Abbeza Mohamed	M	member	-	
25	Mugerwa. Joseph.	M.	Vice-C/m.	0787209881	
26.	NAKYANZI SAIDAH	F	L/R & facilitator	0703397900	