A WEB-BASED MARKETING SYSTEM FOR MARKETING AGRICULTURAL PRODUCTS IN RIFTVALLEY.

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Project documentation submitted to the Department of Information Technology in the school of Computer Science and Information Technology in partial fulfillment of the requirements for the award of the degree of BSc. In Business Information Technology at Dedan Kimathi University of Technology.

February, 2021

DECLARATION

I declare that this is my original work and has not been presented in any university for a degree or for any consideration.

Name …………………………………………………………. signature …………………

Date…………………………………………………

This proposal document has been submitted for examination purposes with my approval as a university supervisor

Name ……………………………………………………signature …………………

Date ………………………………………………………

DEDICATION

I dedicate this project to my loving parents for their tireless efforts and prayers to ensure I complete this project successfully.

ACKNOWLEDGEMENT

Firstly, I want to thank the almighty Father for the good health he gave me to do this project projects successfully. Secondly, I would like to thank my supervisor, Dr. John Wandeto for his advice and recommendations through out the entire project. I thank my loving parents, Mr. David Terer and Nancy Terer for their prayers and financial support during my research.

ABSTRACT

STATEMENT OF THE PROBLEM

Rift valley is one of the regions in Kenya. It was one of the largest and the most economically important province. The main activity in the region is agriculture. Due to the high rainfall and presence of fertile soils makes the area very productive in agriculture.

Farming is done in both large and small scale. Small scale farmers experience several problems in their farming. The main problem being marketing of their harvested produce. They register low income from their produce due to poor market information. This has made many farmers to leave their farming which in many cases is their source of livelihood. Unfortunately, most of Kenya comprises of semi-arid and arid land with low and unevenly distributed rainfall. Crops grown in these areas include maize, sorghum, millet, cowpeas, pigeon peas, cotton, sunflower and other seasonal crops. Production of these crops has over the years depended on weather pattern with good yields in good rainfall years and very low or no crops in severe drought years. It should be noted that small-scale farmers in Kenya received less assistance due to the fact that efforts ware concentrated to large scale farming except for some input seasonal loans on cash crops like cotton, which was grown under irrigation.

**OBJECTIVES.**

The objectives of the system will be :

- to allow farmers register and create account with the website

- to allow farmers post their farm produce.

- to allow customers and other farmers buy products they are interested in

-to allow farmers to share agricultural ideas among themselves

-to allow farmers check prices of various commodities in real time.

-to enable farmers check agricultural information e.g, seed suitable for their

**METHODOLOGY**

The SDLC methodology applicable will be incremental and iterative modes. This is brought about by the farming being dynamic and changes with time and other increments to the system will be added. This is based on building one before building all. Parts of the product are developed and delivered to the users at different times.

**EXPECTED RESULTS.**

The expected results will be to develop a website which allows small scale farmers to effectively sell and buy their produce.

TABLE OF CONTENTS

[CHAPTER ONE: INTRODUCTION 1](#_Toc63430417)

[1.1 BACKGROUND OF THE STUDY 1](#_Toc63430418)

[1.2 PROBLEM STATEMENT 4](#_Toc63430419)

[1.3: PURPOSE OF THE STUDY 4](#_Toc63430420)

[1.4: OBJECTIVES OF THE STUDY 5](#_Toc63430421)

[1.4.1: GENERAL OBJECTIVE 5](#_Toc63430422)

[1.4.2: SPECIFIC OBJECTIVES 5](#_Toc63430423)

[1.5: RESEARCH QUESTIONS 5](#_Toc63430424)

[1.6: RESEARCH SCOPE 5](#_Toc63430425)

[1.7: ASSUMPTIONS 6](#_Toc63430426)

[1.8: LIMITATIONS 6](#_Toc63430427)

[CHAPTER TWO: LITERARUTE REVIEW 7](#_Toc63430428)

[2.1: INTRODUCTION 7](#_Toc63430429)

[2.2: CASE STUDY ONE: Ulima 7](#_Toc63430430)

[2.3: CASE STUDY TWO: NAFIS 8](#_Toc63430431)

[2.4: CASE STUDY THREE: MANDI TRADES (KISAN VIKAS) 9](#_Toc63430432)

[2.5: CASE STUDY FOUR: maano (virtual farmers market) 10](#_Toc63430433)

[2.6: CASE STUDY FIVE: FARM MATCH 11](#_Toc63430434)

[2.7: RESEARCH GAP 12](#_Toc63430435)

[2.8: PROPOSED METHODOLOGY 13](#_Toc63430436)

[3.1: INTRODUCTION 14](#_Toc63430437)

[3.2: RESEARCH DESIGN 14](#_Toc63430438)

[3.3: DATA COLLECTION METHODS 14](#_Toc63430439)

[3.3.1: INTERVIEWS 15](#_Toc63430440)

[**3.3.2**: QUESTIONNAIRES 15](#_Toc63430441)

[3.4: TARGET POPULATION 17](#_Toc63430442)

[3.5: SAMPLING AND SAMPLE SIZE 17](#_Toc63430443)

[3.6: DATA ANALYSIS METHODS 19](#_Toc63430444)

[3.7: SOFTWARE DEVELOPMENT METHOD 19](#_Toc63430445)

[3.8: ETHICAL CONSIDERATIONS 19](#_Toc63430446)

[REFERENCES 20](#_Toc63430447)

# CHAPTER ONE: INTRODUCTION

# 1.1 BACKGROUND OF THE STUDY

Agriculture has been defined as the production of plants and animals useful to man. It deals with not only the cultivation of the soil and management of crops and livestock but also the preparation of plants and animal products for use of man and disposal of surplus of these products through marketing. This definition encompasses the totality of the farmers' duties, whether they are engaged in commercial or subsistence farming. Farmers aim at producing surplus for disposal in the market and the profits accruing thereby, act as the motivating factor for improved and increased production.

Agriculture is described as the back-bone of Kenya's economy contributing approximately 30% of the Gross Domestic Product (GDP) per annum and indirectly contributing about 27% of GDP through linkages with manufacturing, distribution and other related economic activities. The sector also contributes 80% of the country's employment in the rural areas, nearly 60% of total export earnings and 45% of government revenue. Approximately 75% of industrial raw materials for Agro-based industries are contributed the agricultural sector. Additionally, the sector produces all the country's food requirements except for wheat, rice sugar and edible oils.

Unfortunately, most of Kenya comprises of semi-arid and arid land with low and unevenly distributed rainfall. Crops grown in these areas include maize, sorghum, millet, cowpeas, pigeon peas, cotton, sunflower and other seasonal crops. Production of these crops has over the years depended on weather pattern with good yields in good rainfall years and very low or no crops in severe drought years. It should be noted that small-scale farmers in Kenya received less assistance due to the fact that efforts ware concentrated to large scale farming except for some input seasonal loans on cash crops like cotton, which was grown under irrigation.

Agriculture in Kenya is mainly done in rift valley and central region of the country. Our major concern will be the rift valley region.

**Rift Valley Province** was one of Kenya's eight provinces, before the 2013 general election, Rift Valley Province was the largest and one of the most economically important provinces in [Kenya](https://en.wikipedia.org/wiki/Kenya). It was dominated by the [Kenya Rift Valley](https://en.wikipedia.org/wiki/Great_Rift_Valley,_Kenya) which passes through it and gives the province its name. According to the 2009 Census, the former province covered an area of 182,505.1 square kilometers (45,098,000 acres; 70,465.6 sq mi) and would have had a population of 10,006,805,[[1]](https://en.wikipedia.org/wiki/Rift_Valley_Province#cite_note-1)[[2]](https://en.wikipedia.org/wiki/Rift_Valley_Province#cite_note-2) making it the largest and most populous province in the country. The capital was the town Nakuru.

The region is composed of 14 counties which according to the 2019 census had the following figures:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CODE | COUNTY | AREA (KM SQ) | POPULATION (2019 CENSUS) | CAPITAL |
|  | TOTALS | 182,505.1 | 12,752,966 |  |
| 36 | BOMET | 1997.9 | 815,689 | BOMET |
| 27 | UASIN GISHU | 2955.3 | 1,163,186 | ELDORET |
| 28 | ELGEYO-MARAKWET | 3049.7 | 454,480 | ITEN |
| 30 | BARINGO | 11,075.3 | 666,763 | KABARNET |
| 34 | KAJIADO | 21,292.7 | 1,117,840 | KAJIADO |
| 24 | WEST POKOT | 8,418.2 | 621,241 | KAPENGURIA |
| 29 | NANDI | 2884.5 | 885,711 | KAPSABET |
| 35 | KERICHO | 2454.5 | 901,777 | KERICHO |
| 26 | TRANS NZOIA | 2469.9 | 990,341 | KITALE |
| 23 | TURKANA | 71,597.8 | 926,976 | LODWAR |
| 25 | SAMBURU | 20182.5 | 310,327 | MARALAL |
| 32 | NAKURU | 7,509.5 | 2,162,2O2 | NAKURU |
| 31 | LAIKIPIA | 8696.1 | 518,560 | NANYUKI |
| 33 | NAROK | 17,921.2 | 1,157,873 | NAROK |

**M**ost of these 14 counties depend on agriculture as the main economic activity. Agriculture is the only source of livelihood to most families in the region. The counties in the central and the southern part of the region receive high amount of rainfall hence they major mostly on the crop production and dairy livestock production. These counties include: Kericho, Bomet, Nandi etc. on the other hand counties on the northern parts lies within the arid and semi-arid regions in the country hence receive low amount of rainfall. The major economic activity in this region is nomadic pastoralism.

Farming in the regions is done in both large and small scale. Large scale farming is done by big multinational companies like James Finlay company which grows tea in Kericho and Bomet counties and rich farmers. Whereas small scale farming is done by poor farmers and in most cases rely on the returns from the farming to finance their livelihood which include; paying school fees for their children, food, clothing etc. These experience a lot of problems in their day-to-day farming activities. The challenges include: lack of Market for their produce, lack of proper market information, pest and diseases, use of outdated agricultural technology and exploitation by middle men. These challenges have made farmers lose hope and leave farming which is the source of their livelihood.

Lack of market for farm produce is mainly brought about by the domination of the market by large scale and rich farmers and companies. The government seems to ignore about small scale and focus mostly on large scale farming. The small-scale farmers contribute the biggest percentage of the national food requirement as compared to large scale who mostly produce for international markets. Besides, small-scale farmers contribute to generation of employments opportunities, development of agro-based industries, improvement of social welfare and contribution to economic advancement of the country.

Agricultural marketing is a process which starts with a decision to produce a saleable farm commodity, involves all the aspects of market structure or system, both financial and institutional, based on technical and economic considerations, and includes pre- and post-harvest operations, assembling, grading, storage, transportation and distribution (National Commission on Agriculture, 1976). Agricultural marketing plays an important role not only in stimulating production and consumption, but also increasing the pace for economic development. It is the most important multiplier of agriculture development. Agricultural marketing is important in the following ways:

1. Optimization of resource use and output management
2. Increase farm income
3. Widening of markets
4. Growth of agro-based industries
5. Adoption and spread of new technology
6. Employment creation
7. Addition to national income
8. Better living.

Agricultural marketing has been treated as a separate discipline because agricultural commodities poses special characteristics which manufactured commodities does not have. These includes:

1. Perishability of the product-most farm produce are perishable in nature; but their perishability varies from a few days to a few months. Their perishability makes it almost impossible for producers to fix the reserve price for their farm grown products.
2. Seasonality of the production- Farm products are produced in a particular season of the year. They cannot be produced throughout the year. It leads to intra-year seasonality in the prices. In the harvest season, prices of farm products fall. But the supply of manufactured products can be adjusted or made uniform throughout the year.
3. Bulkiness of the product-The characteristics of bulkiness of most farm products makes their transportation and storage difficult and expensive. This fact also restricts the location of production to somewhere near the place of consumption or processing. The price spread in bulky products is higher because of the higher costs of transportation, handling and storage.
4. Variation of quality on product-There is a large variation in the quality of agricultural products, which makes their grading and standardization somewhat difficult. There is no such problem in manufactured goods because they can be produced of uniform quality.
5. Irregular supplies of agricultural commodities- The supply of agricultural products is uncertain and irregular because of the dependence of agricultural production on natural conditions. With the varying supply, the demand remaining almost constant, the prices of agricultural products fluctuate substantially more than that of manufactured products.
6. Processing- Most of the farm products need some kind of processing before consumption by the ultimate consumers. The processing function, though adds value, increases the price spread of agricultural commodities. Processing firms enjoy the advantages of monopsony, oligopsony or duopsony in the market. This situation sometimes creates disincentives for the producers. The characteristics of agricultural commodities mentioned above make their marketing system complex and different than that for manufactured goods.

# 1.2 PROBLEM STATEMENT

The main economic activity in rift valley region is mainly farming. Returns from agricultural produces takes a huge portion in almost all the 14 counties in the region. Farming is done both in large scale and small scale. Agriculture in this region is faced by a number of problems which include; lack of markets, lack of proper market information, the use of outdated farming technology, climate change, diseases and pests, infrastructure, and degraded soil nutrients.

My major concern will be the problem of lack of markets and proper market information. Many farmers register loses annually due to lack of proper market information or lack of markers at all. Farmers sells their farming produce at a throw away price to avoid further loses. The issue of middle men is also a major problem facing small farmers. Middle men come between the farmers and the buyers of their produce and in most cases they buy the produce at lower prices and charges commission for the services.

Lack of proper market information has led to farmers selling their produce at a lower price since they don’t have the necessary information from the surrounding markets within rift valley. Also, good market information helps farmers to have a good calendar on when to harvest their crops.

Use of poor farming techniques and lack of current farming ideas is another problem facing farmers. This is because farmers do not have a platform for farmers where they are facing and other farmers or specialists will reply to them and give them ideas. This helps them to share ideas among themselves hence improving their farming experiences and leads to high production.

# 1.3: PURPOSE OF THE STUDY

The purpose of the study is to increase the access to good markets by small scale farmers in the rift valley region by developing a web-based platform where they can post their farm produce and others, if interested will buy the produce.

# 1.4: OBJECTIVES OF THE STUDY

## 1.4.1: GENERAL OBJECTIVE

The general objective of the research is to improve market opportunities to small-scale farmers in the former rift valley

## 1.4.2: SPECIFIC OBJECTIVES

The specific objectives will be:

The objectives of the system will be:

- to allow farmers register and create account with the website

- to allow farmers post their farm produce.

- to allow customers and other farmers buy products they are interested in

-to allow farmers to share agricultural ideas among themselves

-to allow farmers check prices of various commodities in real time.

-to enable farmers access agricultural information e.g., seed suitable for their areas.

# 1.5: RESEARCH QUESTIONS

The research questions for the research will be:

* How will the farmers buy and sell the produce over the system?
* How does creating an online marketing platform helps to improves agricultural pro of small-scale farmers?
* How does proper market information help to improves returns from agricultural activities?

# 1.6: RESEARCH SCOPE

Small scale farming can be defined as growing of agricultural produce in pieces of lands averaging 0.3-2 ha. Small scale operations account for over 70% of total agricultural production in the country. The study will be focused on the agriculturally dependent regions to be specific rift valley region of Kenya. This is the region that contributes to a high percentage of national food requirement. Most farmers in the region are small scale farmers.81% of farmers owns less than 2 ha which makes them classified as small-scale farmers. These farmers produce agricultural products mainly for food and the surplus commodities the sell them to generate little income.

# 1.7: ASSUMPTIONS

In conducting this research, the following assumptions will be made. It will be assumed that:

* All farmers will have access to smartphone or a computer
* All farmers will have access to good network
* All users of the system are literate and can read
* All users will no be visually impaired and can communicate with the web page.

# 1.8: LIMITATIONS

The main limitations in this research is time; a lot of time is required to gather all the necessary information to implement the web-based platform for farmers. There is also limited time to implement the system since it will require a lot of coding and programming

# CHAPTER TWO: LITERARUTE REVIEW

## 2.1: INTRODUCTION

Literature review involves analyzing various articles and publications to criticize and find information regarding your area of study. Mobile and web-based technology is slowly gaining momentum in the agricultural sector. Farmers are shifting from the traditional technologies of farming to the current technological. The choice of articles was based on those articles covering the current affairs on the agricultural sectors. I analyzed 10 articles and came up with different case study. I analyzed the various mobile applications and web-based applications coming up with the following strengths and weaknesses.

# 2.2: CASE STUDY ONE: Ulima

ULIMA is a mobile platform that provides farmers across Africa with a toolset, database and access to the latest market information. The application was developed by Resolve and provides farmers with access to information on crops, seeds, soil, livestock, agro-chemicals, weather updates and market prices. “ULima allows for ease of reference to best practice methodology,” says Sunesh Bhoola (CEO uLima). This is made possible by key features that are tailor made for each farmer in terms of calendars, and step by step assistance from pre-planting to post-harvest. ULima has nationwide coverage and works in key towns across the country. By January 2018, ULima had 9 different crops including; coffee, tea, sorghum, wheat, pulses, sunflower, sweet potatoes, rice and maize.

The mobile application contains a number of features which are used by farmers in their day to day services. The features include:

1. **Librar**y- This includes crop and livestock information and guidance.
2. **Market-** Latest market price information, including pricing (The information contained in the application is average pricing from region to region collected directly from the market from time to time).
3. **My farm**- this widget provides information on crop and livestock management. This allows for day-to-day management of the farm.
4. **Weather -** the application provides localized weather information.
5. **Forum - f**or sharing information and community chat for subscribers.
6. **Support** - provides an opportunity for subscribers to get support from the technical team.

“With this app, farmers would make reference to best farming practices in the world, thereby increasing yields. One unique feature of the application is that it’s a tailor-made solution for each farmer in terms of crop calendars, thereby offering step-by-step assistance from pre-planting to post-harvest,” he said.

According to Mr Bhoola, perpetual food shortages which is not only in Kenya but also other African countries was the key driver behind the development of the app. “It’s something that needs to be addressed, with improved technology, how best can we use this to our advantage into making Africa a food stable continent,” he said.

He appreciated the fact that not only do improved yields mean that farmers can provide for their own families and communities better, but the growing demand for food across the continent means that output needs to increase.

He noted that Africa, despite having vast tracts of land that are available for agricultural usage, remains a net importer of food. This concern, he continued, needs to be addressed, and the ability of farmers to increase their yield is a step in the right direction.  Users have immediate access to nine crop libraries, and which will soon be increased to twenty eight including some cash crops, five livestock libraries, real-time localised weather information with weather alerts, and the latest market price information by crop, grade and county. An added key feature is the access to tailor-made crop calendars and farmer forums that allow for shared learning across various crop categories.

“uLima will optimise farming potential,” says Bhoola. “We are providing farmers with all the information they require on a ‘one-stop shop’ platform that we hope will drive efficiency and improve yields, and in so doing, improve farmer livelihoods.”

# 2.3: CASE STUDY TWO: NAFIS

NAFIS is an information service developed by the National Agriculture and Livestock

Extension Program (NALEP) to enable farmers to get the extension information simply by

calling the service or browsing the NAFIS website. The themes covered by NAFIS relate to

both general and more specific agricultural topics, from natural resource management, to

processing, post-harvest preservation and marketing. Information is presented with text,

graphics, audio and video in an effort to be as accessible as possible. The idea is that the

farmers would be able to research any agricultural theme in the format most suitable for them

and even download multimedia content for later reference.

The farmer is able to access all the NAFIS information using a mobile phone by calling

NAFIS access number 020-5100102 and then they will be guided accordingly. Alternatively,

farmers can access the NAFIS website to access any agricultural related information.

NAFIS displays free market prices on their website although sometimes the information is

not updated, it provides a relatively accurate picture of prices on the ground. Market prices of

some of the agricultural products such as vegetables are unreliable in Kenya especially when

brokers are involved so these figures are there to guide the farmers on what they expect. The

National Farmers Information Service (NAFIS) was designed primarily as a voice-based

service, intended to serve farmers’ needs in rural areas where internet access is limited.

Farmers receive summarised information using mobile phones by calling the access numbers

provided on the website then moving around the service by pressing the appropriate keys on

phone’s keypad.

NAFIS reduces distances, working times and costs and still offers the farmers benefits of

effective information. (ASDSP; Programme Document  – NAFIS, n.d.)

# 2.4: CASE STUDY THREE: MANDI TRADES (KISAN VIKAS)

Mandi trades is a Location based F2S (Farm to Shop) Trading Platform for Agricultural

Product. It provides Agri-businesses, the technology and expertise needed to create a smarter

and lower cost food supply for consumers in India. It provides the platform with information

about commodity prices directly provided by the Government of India (“Mandi Trades”

App wins Best Solution for Social Good using Open Government Data category of Microsoft

’ s Code for Honor Awards 2014, 2014) . Mandi Trades, takes up the opportunity to

revolutionize life for farmers through a mobile app, substantially designed for farmers

residing in rural areas of India. It’s a one-step platform for Farmers where information about

weather updates, crop prices and agricultural news are all presented in one mobile

application. It aims to solve the problems of marketing and help the farmers to sell their

products in a timely manner. This platform will link farmers and consumers within the

agricultural value chain, easing management and communication about market data. Farmers

can now take informed decision regarding all the steps involved in farming, which includes

selling their produce based on information on current prices, average demand, peak/low

demand season, in and off season needs, rare items and their prices. For farmers, who often

sell their produce to local traders or via middlemen, this could be an important breakthrough

and maximize their profits. It’s a trading platform, helps to make available the local produce

to the national market by connecting the farmers directly with buyers. User can also discover

and connect with nearby farmers directly. Farmers now have access to get details of dealers

selling pesticides, seeds, fertiliser, machinery etc. and also it gives a loan support for needy

from well recognised banks and financial agencies. This is a handy tool for farmers who can

now connect and compare prices and availability beforehand. Agricultural news and weather

forecasts keep the farmer updated at all-time which is essential in taking precautions and planning a better produce. Using location intelligence, user can get a map-based view of both

buyer and seller info, along with the geographical proximity. It is easy to contact farmers via

the app. (Narechania, 2015)

# 2.5: CASE STUDY FOUR: maano (virtual farmers market)

Maano is a mobile application-based platform where the farmers’ surplus and the buyers’ demand

for crops are advertised and traded. It provides a transparent, open and trustworthy space for

smallholder farmers and buyers to negotiate fair prices and deals. It supports the emergence

of sustainable and fair marketplace thereby increasing smallholder farmers’ bargaining power

and potential profits by providing them with real-time information about what their crops are

worth on different markets. It also enables cooperation and knowledge sharing and boosts

farmers’ productivity by ensuring their market access. To achieve sustainability, the maano

virtual farmers market (VFM) aims to introduce a nominal transaction fee on the buyer for

each purchase and at the same time it ensures free access for rural smallholder

farmers (RSHF). The maano virtual farmers market is an application adapted to the needs of

rural Zambia farmers and buyers of their produce. In July 2016, the WFP Innovation

Accelerator provided seed funding to prototype and pilot the Virtual Farmers Market

platform with farmers from the rural areas in three districts in Zambia (Market, Project, &amp;

October, 2017). The maano virtual farmers market application was launched in May 2017.

The maano application is targeting approximately 2,500 Zambian farmers during the 2017

season. A farmer can advertise the produce they have to sell on a dashboard that buyers can

view. Buyers bid on this produce and the highest bidder makes payment at the end of the

bidding period. Maano uses an escrow payment system: payment does not go directly from

the buyer to the farmer. It goes first to the owner of the system (in this case WFP), and is held

by WFP until the exchange of goods takes place. Then WFP releases the payment to the

farmer. Farmers get to chat with each other.

# 2.6: CASE STUDY FIVE: FARM MATCH

Farm match is a web-based system owned and operated by Farm Match, LLC., a Wisconsin

corporation. It was developed to connect the consumers worldwide with the local farmers,

buying clubs, farmers markets and even restaurants. It links the farmers and customers in

United States of America such as Arizona, California, Connecticut, Delaware, Georgia,

Illinois, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota,

Missouri, New Jersey, New York, North Carolina, Northern Indiana, Ohio, Pennsylvania,

Texas, Virginia, Washington DC, Wisconsin and Wyoming (FarmMatch - Connecting

farmers and consumers, n.d.) . Framers select their country and register to the system.

Farmers and consumers will need to register by creating an account with Farm Match in order

to obtain access to certain services. If you choose to create an Account with Farm Match, you

agree to provide only accurate, complete registration information, and you will keep that

information up-to-date if it changes. When you register, you will obtain unique log-in

credentials (a &quot; User ID&quot;). Your access to FarmMatch services must be made using your User

ID and the issuance of the User ID to you does not authorize anyone else to use your User ID

and you are responsible for preventing such unauthorized use. Individuals and entities who

have had their access to the Website or any of the services previously terminated by FC may

not register for an account, nor may you designate any of those individuals to use your

account on your behalf. You are responsible for maintaining the security of your Account and

agree to accept responsibility for all activities that occur under your Account. You agree to

notify FarmMatch immediately of any unauthorized use of your Account or any other breach

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assume any responsibility or liability for the actions, products, services and content of any

merchant, service provider, consumer, or any other third party. Any questions, complaints or

claims regarding a product should be directed to the appropriate merchant. FarmMatch does

not have any responsibility for, or liability related to, any product or services listed on the site

or any transaction you have with any merchant or any disagreement. FarmMatch does not

endorse, warrant, or guarantee the products or services of any merchant. Like every other farming certification or farming rating system in the world, and with the understanding that it

is close to impossible to fully monitor farming practices with an effective, self-intelligent 24

hour surveillance system, FarmMatch relies on the good faith and honesty of the farmer

and/or merchant to provide accurate information concerning applicable farming practices.

Whether implied or otherwise, any displayed FarmMatch rating system makes no warrantee

and gives no guarantee regarding food quality or farming practices. It is up to you to directly

contact the farmer and/or merchant and use your own judgment as a means for determining

food quality and farming practices.

# 2.7: RESEARCH GAP

Most of these systems tend to work similarly to the propose system. They all aim at providing a good experience to farmers by providing them with market opportunities and other agriculture related information. Most of systems identified from the case studies are having certain concepts of marketing

while lacking others. For example, the Mandi Trades for the Indian farmers does not have a

complete transaction between the farmers and the buyers which is a good feature in online

shopping. NAFIS on the other hand only provides extension services by calling their service number or browsing on their website. There is no common link between the farmers and the buyers of the commodities hence farmers cannot sell and ship the products to any seller but just receive extension information and agricultural related information. The Maano virtual marketing only offers farmers to sell commodities but does not provide good marketing information and also weather conditions. The issues of bidding also seem to be a problem to farmers because all bidders might decide to bid at a lower price hence leading to low returns.

# 2.8: PROPOSED METHODOLOGY

The aim is to develop a website that allows small-scale farmer in the rift valley region to buy and sell agricultural produce and other agricultural commodities in an easy and convenient way. One has to be a member in order to post and sell commodities. A new user will have to register with the website and an account is create for them. One can therefore login to the website and access the services. In addition, there is an admin login that determines how best the system works and approving the products posted by the suppliers before the information reaches the buyers.

HTML and CSS will be used to design and style the respective web pages. The registration form will contain several inputs: first name, surname, user name, email address, county, sub-county, ward, password and confirm password fields. It will also have a submit button which allows the information in the web page to be stored in the data is SQL database. The back-end language used will be php to communicate with the database as well as the local server. The data in the database will assume the following form

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| F\_name | surname | User\_name | email | county | Sub\_county | ward | password |
|  |  |  |  |  |  |  |  |

When a member registers he can now login using the user name and the password provided in the registration form. On logging in a user is directed to the home page where he/she can choose to buy or sell a commodity. If one is to sell a commodity, he/she will enter the description of the commodity and submit them. Before being sent to the database, Admin will have to verify the commodity it at all it fits to be advertised. For one to buy a commodity he/she clicks on the commodity and he is shown the description of the description of the particular commodity as well as the contact information of the seller. They can therefore communicate concerning the shipment of the commodity to the buyer.

CHAPTER THREE: METHODOLOGY

# 3.1: INTRODUCTION

This chapter explains the methodology that was used in carrying out the research work. Crucial issues that are discussed in this chapter includes, research design, target population, sample size, data collection and techniques, questionnaires, data analysis techniques and ethical considerations.

# 3.2: RESEARCH DESIGN

Research design refers to the plan and the structure of investigation employed to obtain relevant answers to research questions. According to patricia levy; she thinks research design as building a structure or a plan for your research (Patricia Levy, 2017). This study involved a case study of small-scale farmers in rift valley regions but the research specific to some counties. Case study refers to an intensive investigation on an individual, institution or a phenomenon to get information or to critic it. Descriptive research design was applied in this study. Descriptive research aims to accurately and systematically describe a population, situation or a phenomenon. It can answer what, where, when and how questions, but not why questions. A descriptive research design can use a wide variety of research methods to investigate one or more variable of a research question (Shona McCombes, 2019). Descriptive research design is a systematic, empirical inquiry into which the researcher does not have direct control of independent variables as their manifestation has already occurred or because they are reflecting the state of happenings and qualify the obtained findings through the use of quantitative analysis. Descriptive research is concerned with how, what is or what exists is related to some preceding event that has influenced or affected a present condition or event. This in line with the purpose of the study which sought to identify the major marketing problems and other problems facing farmers. Descriptive research is chosen because the variables under investigation have already occurred. Descriptive research also gives the advantage of collecting original data for the purpose of describing a population which is too large to observe directly hence good for the purpose of generalization.

# 3.3: DATA COLLECTION METHODS

Data collection is the process of gathering and measuring information on variable of interest, in an established systematic fashion that enables on to answer stated research questions, test hypothesis and evaluate outcomes. Two data collection techniques were applied in this research study.

## 3.3.1: INTERVIEWS

Interview method is generally a qualitative research technique which involve asking questions open-ended questions to converse with respondents and collect elicit data about a subject. Interviews are conducted with a sample from a population and the key characteristic they exhibit is their conversational tone.

The method involved face-to-face interviewing of the small-scale farmers to get information on the problems they encounter in their day-to-day agricultural experiences. This method comes with a lot of advantages which include:

1. Accurate screening- face-to-face interviews helps with more accurate screening. The individual being interviewed is unable to provide false information during screening questions such as gender, age or race.
2. Capture verbal and non-verbal ques- face-to-face interview is no doubt going to capture verbal ques but also affords to capture non-verbal ques including body language, which can indicate the level of discomfort with the questions.
3. Keep focus- the interviewer is the one in control of the interview and can keep the interviewee on track to completion.

With the above advantages, however, it has several shortcomings which include:

1. Cost-this is a major disadvantage for face-to-face interviews. They require a staff of people to conducts the interview, meaning there would be personal costs. The cost of traveling to meet the interviewee is also a major concern.
2. Quality of the data by the interviewer- the quality of the data you receive will often depend on the ability of the interviewer. Some people have the natural ability to conduct an interview and gather the data well.
3. Manual data entry- if the interview is administered on paper, the data collected will need to be entered manually, or scanned, If a scannable interview questionnaire is created. Data entry and scanning of paper questionnaires can significantly increase the cost of the project.

## **3.3.2**: QUESTIONNAIRES

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from the respondents (Saul McLeod, 2018). Questionnaires can be thought as a kind of written interview. It can be carried out face-to-face, by telephone, computer or post. They provide a relatively cheap, quick and efficient way of obtaining large amounts of information from large samples of people. This method involved giving the sample farmers a written copy of the question to write down their responses.

Questionnaires are of two types; open and closed questionnaires.

1. **CLOSED-ENDED QUSTIONS**

In closed ended structure gives the answer by only allowing responses from pre-decided categories. Data that can be placed in a category is called nominal data. The category can be restricted to as few as two options, i.e., dichotomous (e.g., ‘yes’ or ‘no’), or include a quite complex lists of alternatives from which the respondents can choose (e.g., polytomous). Closed ended questions can also provide data (which can be ranked). This often involves using a continuous rating scale to measure the strength of attitudes or emotions. Its advantages include:

* They can be economical- they can provide large amount of research data for relatively low costs. Therefore, a large sample size can be obtained which should be the representative of the whole population.
* The respondents provide information which can easily be converted into quantitative data (e.g., count the number of ‘yes’ or ‘no’), allowing statistical analysis of the response.
* The are standardized. All respondents are asked exactly the same questions in the same order. This means a questionnaire can be replicated easily to check foe reliability. Therefore, a second researcher can use the questionnaire to check that the results are consistent.

The only limitation is that they lack detail-because the responses are fixed, there is less scope for respondents to supply answers which reflect their true feelings on a topic

1. **OPEN-ENDED QUESTIONS**

They allow people to express what they think in their own words. Open-ended questions enable the respondents to answer in as much details as they like in their own words. If you want to gather more in-depth answers from your respondents, then open questions will work better. These gives no pre-set answers options and instead allows respondents to put down exactly what they like in their own words. They are usually used for complex question that cannot be answered in a few simple categories but require more detail and discussion.

On of the advantage of this method is that, rich qualitative data is obtained as it allows the respondents to elaborate on their answer. This means the research can find out why a person holds a certain attitude or stand.

**LIMITATIONS**

* Time consuming to collect the data- it takes longer for the respondents to complete an open question. This is a problem as a smaller sample size may be obtained.
* Time consuming to analyze data- it takes longer for the researcher to analyze qualitative data as they have to read the answers and try to put them in categories by coding, which is often subjective and hard. However, Smith (1992) has devoted an entire book to the issues of thematic content analysis that includes 14 different scoring systems for open-ended questions.
* Not suitable for less educated people as open questions require superior writing skills and a better ability to express one’s feelings verbally.

# 3.4: TARGET POPULATION

The target population was 10 farmers from each of the sub-counties in the counties of Nakuru, Kericho and Bomet.

# 3.5: SAMPLING AND SAMPLE SIZE

According to Alicia Tuovila (2020), sampling is a process used in statistical analysis in which a pre-determined number of observations are taken from a large population. The methodology used to sample from a large population depends on the type of analysis being performed. There are various methods of sampling which include

**Simple random sampling**-in this case each individual is chosen entirely by chance and each member of the population has equal probability of being chosen. One way of obtaining random sample is to give each individual in a population a number, and then use a table of random numbers to decide which individuals to include.1 For example, if you have a sampling frame of 1000 individuals, labelled 0 to 999, use groups of three digits from the random number table to pick your sample. So, if the first three numbers from the random number table were 094, select the individual labelled “94”, and so on. As with all probability sampling methods, simple random sampling allows the sampling error to be calculated and reduces selection bias. A specific advantage is that it is the most straightforward method of probability sampling. A disadvantage of simple random sampling is that you may not select enough individuals with your characteristic of interest, especially if that characteristic is uncommon. It may also be difficult to define a complete sampling frame and inconvenient to contact them, especially if different forms of contact are required (email, phone, post) and your sample units are scattered over a wide geographical area.

**Systematic sampling**-Individuals are selected at regular intervals from the sampling frame. The intervals are chosen to ensure an adequate sample size. If you need a sample size n from a population of size x, you should select every x/nth individual for the sample. For example, if you wanted a sample size of 100 from a population of 1000, select every 1000/100 = 10th member of the sampling frame. Systematic sampling is often more convenient than simple random sampling, and it is easy to administer. However, it may also lead to bias, for example if there are underlying patterns in the order of the individuals in the sampling frame, such that the sampling technique coincides with the periodicity of the underlying pattern. As a hypothetical example, if a group of students were being sampled to gain their opinions on college facilities, but the Student Record Department’s central list of all students was arranged such that the sex of students alternated between male and female, choosing an even interval (e.g. every 20th student) would result in a sample of all males or all females. Whilst in this example the bias is obvious and should be easily corrected, this may not always be the case.

**Stratified sampling**- In this method, the population is first divided into subgroups (or strata) who all share a similar characteristic. It is used when we might reasonably expect the measurement of interest to vary between the different subgroups, and we want to ensure representation from all the subgroups. For example, in a study of stroke outcomes, we may stratify the population by sex, to ensure equal representation of men and women. The study sample is then obtained by taking equal sample sizes from each stratum. In stratified sampling, it may also be appropriate to choose non-equal sample sizes from each stratum. For example, in a study of the health outcomes of nursing staff in a county, if there are three hospitals each with different numbers of nursing staff (hospital A has 500 nurses, hospital B has 1000 and hospital C has 2000), then it would be appropriate to choose the sample numbers from each hospital proportionally (e.g. 10 from hospital A, 20 from hospital B and 40 from hospital C). This ensures a more realistic and accurate estimation of the health outcomes of nurses across the county, whereas simple random sampling would over-represent nurses from hospitals A and B. The fact that the sample was stratified should be taken into account at the analysis stage.

Stratified sampling improves the accuracy and representativeness of the results by reducing sampling bias. However, it requires knowledge of the appropriate characteristics of the sampling frame (the details of which are not always available), and it can be difficult to decide which characteristic(s) to stratify by.

**Clustered sampling-** In a clustered sample, subgroups of the population are used as the sampling unit, rather than individuals. The population is divided into subgroups, known as clusters, which are randomly selected to be included in the study. Clusters are usually already defined, for example individual GP practices or towns could be identified as clusters. In single-stage cluster sampling, all members of the chosen clusters are then included in the study. In two-stage cluster sampling, a selection of individuals from each cluster is then randomly selected for inclusion. Clustering should be taken into account in the analysis. The General Household survey, which is undertaken annually in England, is a good example of a (one-stage) cluster sample. All members of the selected households (clusters) are included in the survey.1

Cluster sampling can be more efficient that simple random sampling, especially where a study takes place over a wide geographical region. For instance, it is easier to contact lots of individuals in a few GP practices than a few individuals in many different GP practices. Disadvantages include an increased risk of bias, if the chosen clusters are not representative of the population, resulting in an increased sampling error.

The 10 farmers from each subcounty were selected by putting the farmer in clusters. The clusters were determined by the size of the farms owned by farmers. The cluster was in the range of 0-0.5 ha, 0.6-1.0 ha, 1.1-1.5 ha and 1.6-2.0 ha. Simple random sampling was the applied by assigning the farmer with numbers and then farmers were picked after an interval of 50 farmers.

# 3.6: DATA ANALYSIS METHODS

Frequency counts of the responses are then obtained, to generate descriptive information about the respondents that participated in the study and to illustrate the general trend of findings on the various variables that were under investigation. This involved the use of percentages and tables because they help to summarize large quantities of data whilst making the report reader friendly. The data from the interviews was carefully read. The responses were edited for grammatical correctness, coherence and precision and presented as quotations so as to triangulate the data obtained through the administration of the close ended instruments, which is qualitative in nature. The responses were organized; coded and analyzed using descriptive statistics (tables, frequencies, percentages).

# 3.7: SOFTWARE DEVELOPMENT METHOD

Since this is a website, hypertext markup language(html) is used and cascading style sheet (CSS) are used for the design of the website. php will be use as the server-side scripting language. SQL is used on the database side. Java script will also be used as a scripting language

# 3.8: ETHICAL CONSIDERATIONS

During this research process, I upheld integrity and high moral standards. I sought permission from the farmers before distributing the questionnaires and before conducting the various interviews. I kept time, respected the respondents’ feedback and decision and treated the information given by the respondents with confidentiality so that they cannot be disclosed to any third party without their consent.

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