

MOBILE-BASED FARMER MARKET INFORMATION APPLICATION

CASE STUDY: NAADS

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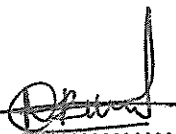
**A RESEARCH REPORT SUBMITTED TO THE COLLEGE OF APPLIED
SCIENCE AND TECHNOLOGY FOR THE STUDY LEADING TO
A PROJECT IN PARTIAL FULFILLMENT TO THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE
OF BACHELOR OF INFORMATION
TECHNOLOGY, KAMPALA
INTERNATIONAL UNIVERSITY.**

SEPTEMBER, 2012

Declaration

I Namono Rachael do hereby declare that this report is my original work and has never been submitted for any award of a degree in any institution of higher learning.

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Approval

I certify that this project is the original work of the above named student and has been done under my supervision. The work has never been submitted for any award of a degree in any institution of higher learning.



Signed.....date

supervisor

10th Sept 2012

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Dedication

I dedicate this report my parents, guardians and supervisor and all those who have supported me in my research and findings. May the almighty God bless you all.

Acknowledgement

I am grateful to several people for the support and guidance they accord us. Special thanks go to Mr. Faik Kasawuli our Supervisor for enabling me to realize the importance of time management for his continued guidance throughout the course of the project. To the mentors, thank you for the advice and support.

I am lucky enough to work with a group of enthusiastic and communicative people, my colleagues and the lecturers, thank you for being cooperative and helpful.

I thank my parents for the encouragement, love and financial support they gave us. Most importantly, I thank the Almighty God for keeping me strong and healthy and enabling me to complete this course.

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LIST OF ABBREVIATIONS

NAADS-THE NATIONAL AGRICULTURAL ADVISORY SERVICES

ATAAS-AGRICULTURAL TECHNOLOGY AND AGRIBUSINESS ADVISORY SERVICES

GSM-GLOBAL SYSTEM FOR MOBILE COMMUNICATION

DFD-DATA FLOW DIAGRAM

LABER-INSTITUTE AFRICAN DE BIO-ECONOMIES RURAL

WWW-WORLD WIDE WEB

MM4D-MARKET DESIGN FOR DEVELOPMENT

LINKS-LIVESTOCK INFORMATION NETWORK KNOWLEDGE SYSTEM

UML-UNIFIED MODELING LANGUAGE

J2ME-JAVA-MICROEDITION

PHP-HYPERTEXT-PREPROCESSOR

OS-OPERATING SYSTEM

HTML-HYPERTEXT MARKUP LANGUAGE

MY-SQL-MY STRUCTURED QUERY LANGUAGE

CSS-CASCADING STYLE SHEET.

ABSTRACT

Under normal circumstance, farmers should benefit most from their produce but often middleman do. This is because the middleman often misrepresentation the true cost of the produce to the farmers and in this confusion farmer's end up being cheated because of this information gap (middlemen often under price the produce and take a bigger share of farmers incomes). In this research, we have designed, implemented and tested a mobile and web-based system that will aid farmers by timely checking on mobile phones for the current price for their agricultural products in various markets around the major markets like Kireka, Nakawa, Owino, Karerwe, Kiseka and Nakasero markets. This price information is updated by NAADS officials and uploaded on their servers.

CHAPTER 1

1.0. Introduction

Mobile Farmer Application was a fully automated application aimed at enabling farmers to know about the prices of their products in different markets in Kampala without having to travel there physically. Farmers use middlemen who buy their products at low costs who then later sell them to final clients at higher prices. This affected farmers by them not making the optimal profits from their produce.

1.1. Background

The National Agricultural Advisory Services (NAADS) is a program running under the government of Uganda aimed at increasing the efficiency and effectiveness of agricultural extension service. Mobile Farmer Application targets the poor subsistence farmers, the same goal as NAADS. The Program is currently in its Phase II implementing under the Agricultural Technology and Agribusiness Advisory Services (AT AAS) a project that has capacity to boost activities of NAADS. Mobile Farmer Application comes at a right time when the government wanted to modernize agricultural sector.

The idea of the farmer moving physically to the market to verify prices was costly.

1.2. Problem Statement

Farmers were facing problems such as knowing where the market for their products was, the different prices for those products in different markets, climatic changes and thus they resorted to using middlemen to feed them with that information or rather sold their products to them who later sold them at a higher price enjoying enormous profits at the expense of the farmer. These called for an application that was to curb these problems and making the farmer get the current information about the market and thus promoting him/her in his business.

1.3. Objectives

1.3.1. Main Objective

To design and implement a Mobile Farmer Application after reviewing appropriate literature that would enable farmers get timely and current market prices in several market areas without involving middlemen.

1.3.2. Specific Objectives

- a) To review literature and study the current process of getting market prices so as to obtain requirements with a view of coming up with a functional Mobile-based Farmer market Application.
- b) To design an Application that would accommodate the farmer functional and user requirements.
- c) To implement the designed system.
- d) To test and validate the working application that would enable us identify errors with our system and take corrective measures to reduce them.

1.4. Scope

The project focused on implementing a Mobile-based Farmer market Application that would be used by farmers in carrying out their daily marketing activities in absence of middle men.

1.5. Expected Significance of the system

- a) The system will increase the revenue of the farmer by making him increase profits on his products.
- b) The project will produce a Mobile-based Farmer Market Application that will be used by farmers to enable them know optimum market price for their products.
- c) The system will provide farmers with information about the market prices.
- d) The system will provide an easy mechanism for farmers to retrieve the information they wanted so as to avoid making wrong decisions on supply.

e) The system will enhance easy, direct communication to farmers about market situations.

The Mobile-based Farmer Market Application played a major role in ensuring that farmers were not ripped off their produce pertaining the market prices by middlemen. The application enhanced easy communication by NAADS to farmers using GSM (Global Systems for Mobile Communication) technology to easily send SMS to farmers using the numbers stored in their database harvested from farmers.

Being mobile based application, the project helped uplift the technological standards of Uganda and helped in the growth of the ICT sector of the country and the agriculture sector as a whole.

CHAPTER 2

Literature Review

2.0. Introduction

This chapter presented the various literature from researchers on the different types of market price information systems, how they operated, their advantages, how they were managed and how effective they were as well as the value they brought to farmer's who used the systems. Literature review discusses published information in a particular subject area, and sometimes information in a particular subject within a certain time period .University of North Carolina, (1998).

2.1. Description of the current situation

Accessing market price information in various market's is not easy for farmers in Uganda, despite the fact that, various organization's exist that are supposed to provide information about various prices, this organizations lacked a means of dispensing this information to farmer's in an organized and efficient way.

Some had resorted to pinning up prices for agricultural commodities in different markets on their notice boards, some used televisions and the print media inform of newspapers for disseminating this information to the farmer's.

Some premium service provider's had taken it upon themselves to gather and disseminate this information but often their information is usually not up to date and does not provide the true picture in the field and the prices that they charge for the premium SMS that they use to disseminate this information was often in itself exorbitant.

As it had been observed the above described method's for disseminating market price information were cumbersome and expensive and this therefore necessitated for building of a Mobile Farmers Application that would disseminate market price information to farmer's about market prices of various commodities in different markets in an effective and efficient way.

2.1.1. Limitations of the current system

- Due to the fact that farming activities took place in the rural market's farmers are not able to access timely and accurate market prices and end up selling their produce at a loss.
- The cost of accessing market price information is high i.e. in the case of premium SMS and this discourage farmers from trying to access market price information.

- The current systems do not provide Reliable market price information and there is a lot of disparity between the actual and the price that is quoted for a farmer by middlemen.
- The designed systems do not take into account both the low literacy levels of farmers as well as the limitations of the mobile screens and text capacities.
- The systems often provide outdated information to farmers. This is because some are updated weekly, even monthly.
- Additional services like farm inputs and fertilizer prices are not to be incorporated in the above existing systems and these farmers have to use other means to access this information.

2.2. Related systems (existing systems)

2.1.1. Market Price Information System Using Web and National Television - Burkina Faso

According to IICD, (2005), accessing market price information was not easy for farmers in Burkina Faso. To solve this, early 2005, the Institute African de Bio-Economies Rural (IABER), with financial support from IICD, initiated a project to provide information on agricultural markets through a television programme entitled TV Koodo, which was linked to the IABER website (www.iaber.bf). The show provides viewers of Burkina Faso's national television channel with monthly information about market prices for livestock and grain. It also informs people about the trials and tribulations of agricultural life in an entertaining way by using puppets, with guests invited to participate in the broadcasts. The show has over one million viewers.

2.2.2.1. Objectives of the Market Price Information System.

The overall objective of the project was to disseminate price information on agricultural products, especially cereals, oil products and animals, on a national scale through television and a specially designed website.

Specific objectives were:

- *Producing content* - To produce and disseminate television programs on agricultural (price) information.
- *Online Price Information* - To provide online agricultural price information.

- *Build Capacity* - To develop the capacities of the Institut Africain de Bio-Economie Rurale (IABER), the project owner.
- *Set up a database* - To set up agricultural databases for research and decision making.

2.2.2.2. Impacts.

TV Koodo specifically targets farmers and others involved in the agricultural and livestock marketplace. On the specially designed TV Koodo website, they can look up the market prices (for instance, on cattle and cereals) that were mentioned in the show.

Through the price information disseminated by TV Koodo and on the market boards, farmers will have increased access to the market price of their crops which will enable them, in turn, to sell their crops at higher prices, resulting in higher income.

Although farmers are the target audience for TV Koodo, the television programme also appeals to a broader audience: the general public, including policymakers and donors, also find the show informative and entertaining as compared to the mobile-based farmer's information system where all the audiences are catered for.

2.2.2.3. Market information system for the agricultural markets in Romania

According to ideas, (2009) Market information system for the agricultural markets **III** Romania was envisaged. On the web site www.preturiagronet.ro the created database, the prices of the main crop and animal products are displayed on the basis of certain inputting mechanisms discussed and agreed with the five partners (associations and professional organizations in the field) involved in project development. The infrastructure used for the program design and the partial results concerning the inputting for agricultural prices in the created database.

While in the mobile-based farmers information system the prices of the products target the farmers be able to realize which market place has better prices so as they can decide on where to take them.

2.2.3. Livestock Information Network Knowledge System (LINKS)

According to Mobile Market Design for Development MM4D ,(2005) LINKS is a project led at the Texas AM University. It collect information regarding market reports, livestock availability forecasts and food shortage trends in Ethiopia, Kenya, Djibouti, Somalia, Tanzania and Uganda. The project includes the development of a livestock early warning system. Its main goal is to monitor and improve food security as compared to mobile-based farmer's information system which is concerned with availing different market prices to the farmers.

2.3. Contributions

Much emphasis has been put on both modem and high technology and also low technology agricultural market price information systems but there is still a need still a need to build and adopt an appropriate integrated mobile based Market Price Information System that provide accurate, in depth market price information for farmer's in Uganda.

2.4. Why use databases

Data storage, retrieval and update Connolly and Begg, (2004). In an agricultural market price information systems, databases are useful since in the information is dynamic in nature and often needs frequent and daily updates, retrieval and deletion.

2.5. Security

Computer security deals with prevention and detection of unauthorized actions by user of a computer system. An access control system for example prevents intruders from gaining access to the computers. This ensured that the right people use the computers at all times in our system we prevented unauthorized access by implementing a logins for all restricted areas of the agricultural market price information systems so as to only allow in users who have privileges of viewing what they needed to view to really view it.

2.6. Benefits

The internet allowed distributed applications running on end systems to exchange data between them this was according to James and Keith, (2000). These applications included remote login and file transfer.

- I. Having an agricultural market price information systems running over the internet enabled the mobile application to provide timely item's price display and accurate data to users of the system.
- II. The system cut down on costs by reducing on the cost of acquiring the information that a farmer needed through other methods of sharing market price information.
- III. The number of attendants who could effectively administer the market price information system was low since only one attendant was required to update delete or modify information.

2.7. Conclusion

On studying the current Market Price Information Systems and through literature reviews the current Market Price Information System had some limitations among them they include Farmer's inability to access timely and accurate market prices which forces them to sell their produce at a loss, the cost of accessing market price information was high.

The designed systems didn't take into account both the low literacy levels of farmers as well as the limitations of the mobile screens and text capacities. Hence the need for designing the mobile-based farmers information system which caters for all the above limitations and even much more.

CHAPTER 3

3.0. Methodology

3.1. Overview

This chapter mainly focused on the basic methodologies for requirements collection, system design, implementation and testing and evaluation techniques that were used during this research. The main goal was to design and implement a Mobile application based Market Price Information System that would enable Farmer's to get access to market prices for their produces in an efficient and coordinated manner without needs for middlemen.

The project produced a mobile application based Market Price Information System that was used to easily access and report all relevant market price information.

In the first section, an analysis of the literature of the existing technologies such as web technologies, SMS based technologies and Internet based technologies were performed with the aim of identifying strengths and shortcomings of the current technologies with regard to research of our project. The next section addressed techniques used for determining of system requirements, followed by design techniques deployed and the techniques used to implement the Mobile application based Market Price Information System ending with the testing and validation section.

3.2. Literature review

In achieving the objective of reviewing of current technologies used and existing literature, examining documents, interviews, observing the enterprise in operation, research, and questionnaires were used.

Document examination is a means of identifying forgery and establishing the authenticity of documents in dispute. A document examiner verifies a document to:

identify handwriting and signatures, identify a document as a forgery, identify typewriters, check writers, and photocopies, detect alterations, additions, deletions, or substitutions, decipher

alterations and erasures, identify and decipher indented writing and identify comparisons of inks and identification of type of writing instrument.

Research were preferred for clarity and verification of facts to collect information about existing technologies and associated problems through avenues like reference books, journals and the Internet as good sources of information on approaches used elsewhere to solve similar existing and arising problems.

3.3. Requirements determination techniques

In achieving *objective (a) above* of obtaining the requirements to design and implement a Mobile application based Market Price Information System, a technology study and analysis for the pricing needs for farmer's was carried out.

3.3.1. Observations

This is a method of data collection in which the situation of interest is watched and the relevant facts, actions and behaviors are recorded.

Close observation on how farmer's carry out their daily activities, analyze and get distributed market price information from staff in various departments of NAAD'S was investigated.

Whereby it was mainly used to assess the process that took place in order to actualize and execute the activities that go into distributing market price information to farmers.

As participant observers, researchers got a chance to interact with the current technologies and gave a detailed observation report.

- The following are reasons for using observation method:
- To make it possible to collect different types of data, being on site over a period of time.
- To provide us with a source of questions to be addressed to NAAD'S management and farmer's.
- To help us get a feel on how things are organized and prioritized during the entire process.

3.3.2. Interviews

An interview is a conversation between two or more people (the interviewer and the interviewee) in a context where the questions are asked by the interviewer to obtain information from the interviewee the free dictionary, (2007). Interviews were conducted with the help of a number of groups using the current technologies i.e. management and staff of NAAD'S and farmer's.

Interviews are used because:

- They helped to document personalities of prospective users of a Mobile application based Market Price Information System
- They assisted to expand our understanding of the NAAD'S operations thus we are in a better position to collect requirements.

3.3.3. Questionnaires

Questionnaires are forms containing a set of questions addressed to a statistically significant number of subjects as a way of gathering information for a survey the free dictionary, (2007). Questionnaires was used to capture raw data from individuals at NAAD'S .Questionnaires were used to capture raw data from individuals in the shortest time possible. They contained direct questions designed to strategically attain data on particular fields. Questionnaires were used to confirm the data that was collected using observation and interviews .

The questionnaire method of data collection had the following advantages:

- Questionnaires are familiar to most people since nearly everyone has had some experience completing questionnaires before.
- Questionnaires reduce bias since there is a uniform question presentation. The researchers' opinions will not influence the respondent to answer questions in a certain manner thus offers great anonymity.
- Questionnaires are easy to administer and analyze once completed.

3.4. System Design

In achieving *objective (b) above* of system analysis and designing of the proposed Mobile application based Market Price Information System, researchers designed the database using conceptual, logical and physical database a design using ERD and table schemas System design was done based on Object oriented design methodology using the Unified Modeling Language (UML), dataflow diagrams. We used Dataflow diagram to show the flow of data and activities within the system. These were developed using tools such as Microsoft Visio studio. Project management tools such as Microsoft project professional were used to present the time schedules for the system development procedures, task dissemination and ordering.

3.5. System Implementation tools

In achieving *objective (c) above* the system was implemented using a client-server model which involved having a main server that provided information to mobile phones, which were known as the clients that accessed it through the internet. The server run a server-side program that was accessed by client programs through the internet.

3.5.1. Server

Essentially the server is a computer with server software installed and running, connected to a network. The server must be networked for connection with other machines by connecting it to the clients. The system included a server side application. The following applications were used to implement the server side application.

3.5.2. PHP

We chose to use PHP due to the advantages that fall under object oriented programming languages. Object oriented languages enhance the need to expand a program where features of the objects in the program can be added independently without reorganizing the system.

3.5.3. Database

The system has a database on which the rest of the application was based. We used SQL for the Mobile Farmer Application system database.

3.5.4. Client interface

In the implementation of a working Mobile application based Market Price Information System for farmer's, we used J2ME, to enable me come up with an interactive, dynamic and effective interface.

3.6. Validation and testing methodologies

➤ White box testing

Sometimes referred to as Clear Box Testing or Code-Based Testing or Structural Testing is software testing method in which the internal implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. White box testing is testing beyond the user interface and into the nitty-gritty of a system.

➤ Black box testing

Testing the application without coding /programming knowledge that means the tester doesn't require coding knowledge. He examines the application external functional behavior and GUI features. The features of the system are user friendly according to the developers.

➤ Usability testing

Usability testing is a method by which users of a product are asked to perform certain tasks in an effort to measure the product's ease-of-use, task time, and the user's perception of the experience. Changes are made to the application or site based on the findings of the usability tests. Whether the test is formal or informal, usability test participants are encouraged to think aloud and voice their every opinion. Usability testing is best used in conjunction with user-centered design, a method by which a product is designed according to the needs and specifications of users. This was done completely and the users of the system found it more user friendly.

This **testing** was done to ensure that the system had been accepted by the users in this case the farmers. This testing helped me to know whether the functionality of the system had been achieved and check for errors.

The **validation** was done through an experiment in an actual computer and mobile phone if available or a simulator where the system was deployed in a server and actual users were able to interact with the system and provided feedback.

CHAPTER 4

4.0. System Analysis and Design

4.1. Introduction

This chapter focuses system analysis, determining of requirements that is; user, functional and non-functional requirements and system design among others.

4.2. System Analysis

Before embarking on the design process, different end user requirements were fully understood. They were identified by using questionnaires, interviewing and observing end users. Requirements were categorized into three mainly user requirements, functional requirements and non-functional requirements.

4.2.1. User Requirements

Users are the people who interact with the system in one way or the other. Potential

Users of the system are the general public (farmers), system administrators, and organizations that many need to do further data processing with the system data. The different user requirements are described below:

4.2.1.1. General Public (Farmers)

- View the Prices offered by different market by date.

4.2.1.2. System Administrators

- Ensure proper functioning of the system by making sure all messages are sent with a minimal error ratio.
- Update the price information in the system
- Delete old prices information from the system

4.2.1.3. Concerned Organizations (NAADS)

- At an analytical level data collected from the systems is used in bulk by organizations like NAADS which are concerned with the quality provision of services or farm products.

4.2.2. Functional Requirements

- ❖ The system allows system administrator to create, delete and view accounts for other administrators.
- ❖ The system only allows administrators with accounts, the ability to carry out the data manipulation operations like retrieval, submission of records about fish market prices ∴. The system allows registered members to log into the system and out of their accounts on their mobile phones.
- ❖ The system should be able to provide users with available products and their prices offered by the different market places from the database in an appropriate manner.
- ❖ The system should be able to display the prices, items and current date for each recorded, updated item from the database.

4.2.3. Non-functional Requirements

- Non functional requirements only look at the constraints of the system under the design processes.
- Ease of use: The system should be easy to use and intuitive. The system documentation and user manual should be provided.
- Reliability: The system should have little or no down time and connectivity must always be available for the users. The data must be correctly stored in the database.
- Security: Each system user is required to fill his user name and password. The system should log in only authenticated users
- User input validation: If the user leaves any of the fields blank, the system should prompt the user to enter valid data in that particular field. This ensures that only authorized udders get access to the system data.

- Performance: The system should have a quick response time and should be able to handle multiple users concurrently.

4.2.4. System Requirements

This section describes the hardware and software requirements of the system

Hardware	Requirements	System requirements
Web based application	Server space	Minimum capacity of 1 Gb

Table 4.1: A description of Hardware Requirements

Mobile Application	Requirements	Type Required
	Operating System	Symbian O.S
	Connectivity	Internet connection
Web-based Application		
	Web-server	Apache HTTP Server, Sun Java System Web Server
	Web browser	Any web browser e.g. Mozilla Firefox
	Connectivity	Internet connection

Table 4.2: A description of Software requirements

4.3. Process Modeling

Representation of the system was done by use of a Data Flow Diagram. This describes the design that includes: the structure, behavior, and interaction of the different components in the system, the context diagram and the architecture of the system.

4.3.1. Context diagram for Mobile-Based Farmer Market Information

This shows the farmer administrator as the major stake holder and the mobile-based farmer market information system they interact with.

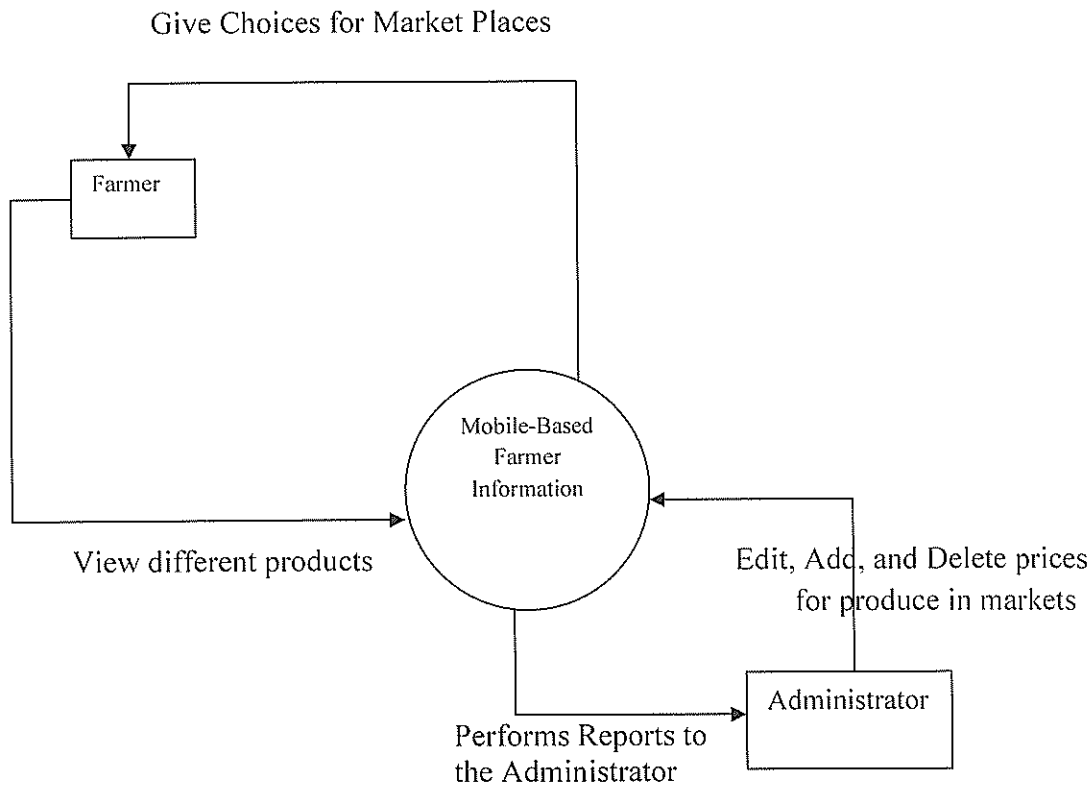
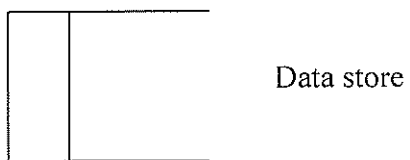
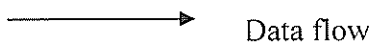
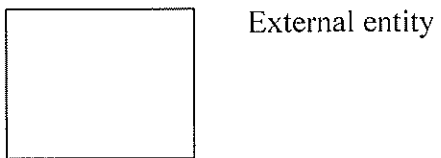
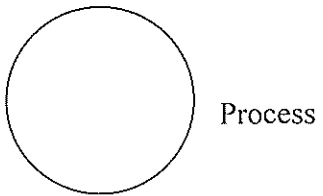


Figure 4.1: Context diagram for Mobile-Based Farmer Market Information

KEY SYMBOLS



4.3.2. Data Flow Diagram for the Mobile-Based Farmer Market Information (Level)

Figure 4.3: shows how a Mobile-Based Farmer Market Information system is decomposed into sub-processes that interact with data stores and external entities. These sub-processes are described below

4.3.2.1. Authenticate (Process 1)

The above mentioned process accepts administrator to login and verifies this information before granting these users access to the system.

4.3.2.2. Registration (Process 2)

This process captures administrator's details and registers them into the system. This is done by the system and this information is then stored in the database. This can also be done at the main office by administrators.

4.3.2.3. Selection process (process 3)

This process allows the farmers to enter the details of the produces in the system and it is stored into the application store.

4.3.2.4. Updating process (Process 4)

This process enables administrator update and edits information. It is especially useful in representing how the products information is retrieved from the database to undergo transformation with every alteration made by the end users.

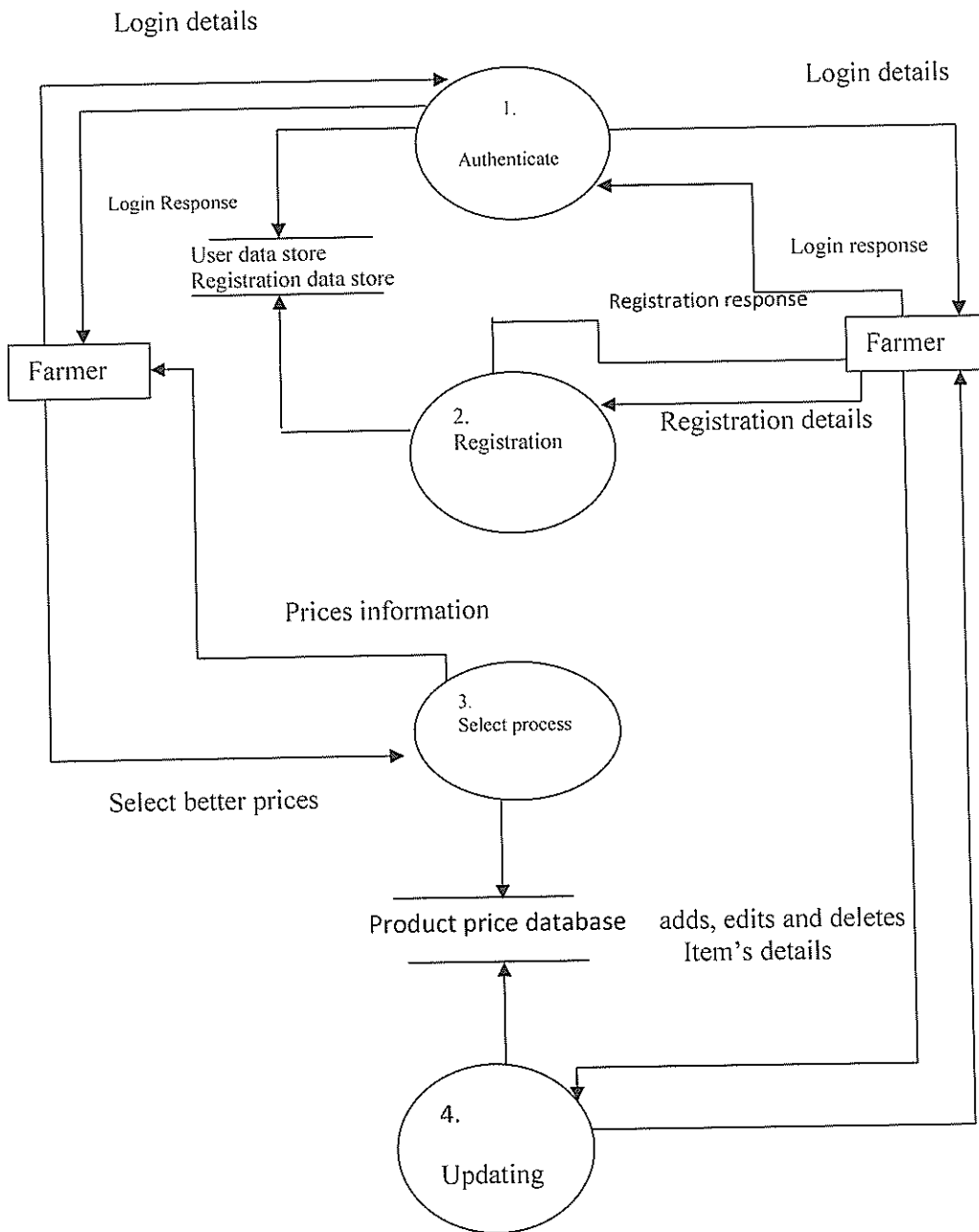


Figure 4.2: level 1 Data Flow Diagram for the Mobile-Based Farmer Market Information

4.3.3. Data dictionary describing Level DFD on figure 4.3

4.3.3.1. Data dictionary for data flows

Data flow name	Description
item prices	These are the market prices for different produces
Produces	These are the farm produces e.g Maize e.t.c
Market places	These are places where farm produces are taken for sale
Existing services	These are services that already available

Table 4.3: A data dictionary for data flow.

4.3.3.2. Data dictionary for data stores

Data store name	Description
User data flow	Stores the users of the system
Registration data flow	Store all the registration information which is provided by the different.

Table 4.4: A data dictionary for data stores

4.4. Data Modeling

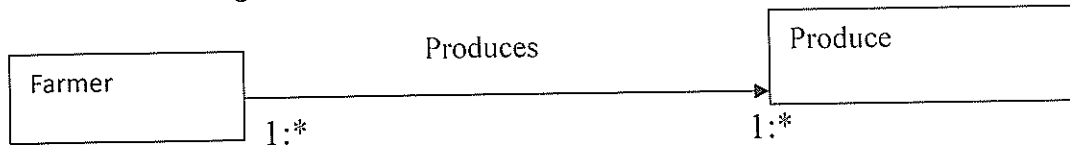
Data modeling is the analysis of data objects that are used in a business or other context and identification of the relationships among these data objects.

4.4.1. Conceptual Data Model

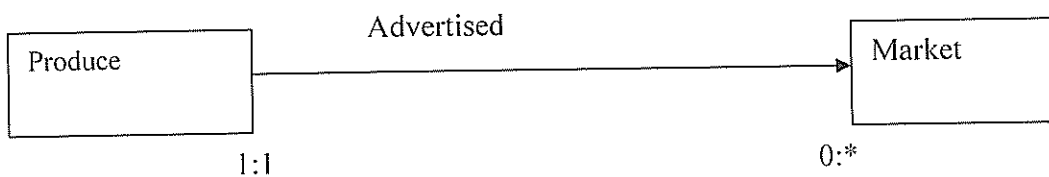
	Entity name	Description	Attributes
1	Market	Stores the	Id name location produce
2	Produce	Stores the information of the different markets	Id price date of the price category
3	user	Stores the information of the	Id First name Iname role

Table 4.5: A description of entities and their attributes

4.4.2 Modeling relationships between entities



A farmer produces one or many produce and produce are produced by one or many farmers. Hence the cardinality, multiplicity of this relationship is a 1: M



Produce can be advertised on 1 or many markets while the market advertises one or many produce. Hence the cardinality, multiplicity of this relationship is a 1: M



One Administrator can- change 1 or many produce while the produce is changed by one or many Administrators. Hence the cardinality, multiplicity of this relationship is a 1: M

4.4.3. Entity Relationship Diagram for Mobile-Based Farmer Market Information

The diagram below describes in detail the entities involved and the relationships between these entities

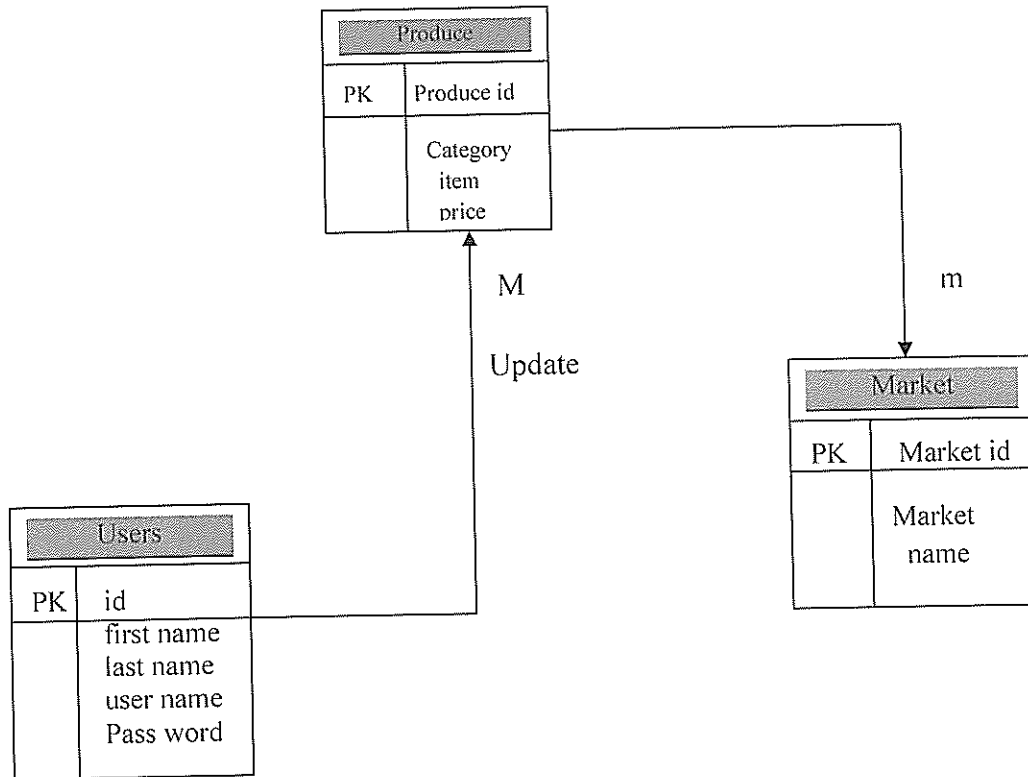


Figure 4.3: Entity Relational Diagram for Mobile-Based Farmer Market Information

4.4.4. Conceptual design

1.) Requirement Analysis:

List of Entities:

- Market
- Produce
- user

4.4.5. Logical designs

1. Market: Table schema.

S.no	Field name	Data type	Description	Constraints
1	Id	Integer	Identity number of the Market	Primary key
2	Location	Varchar(100)	Location of the Market Place	
3	Name	Varchar(100)	Name of the given market	

Table 4.6: A description of entity market

Schema definition:

```
CREATE TABLE market (id integer primary key NOT NULL AUTO_INCREMENT, location  
Varchar(100), item Varchar(100), name Varchar(100) );
```

S.no	Field name	Data type	Description	Constraints
1	Id	Integer	Identity number of the Market	Primary key
2	Price	Varchar(100)	Prices of the items	
3	Date	Varchar(100)	Date the recorded	
4	Category	Varchar(100)	Category of the produce	

Table 4.7: A description of entity produce

Schema definition:

```
CREATE TABLE produce (id integer primary key NOT NULL AUTO_INCREMENT, price  
varchar(100), date date, category varchar(100) );
```

user: keeps the data of all the produces in users.

S.no	Field name	Data type	Description	Constraints
1	Id	Integer	Identity number of the Market	Primary key
2	fname	Varchar(100)	Category of the produce	
3	iname	Varchar(100)	Item sold in a given market	
4	role	Varchar(100)	Prices of the items	

Table 4.8: A description of entity user

Schema definition:

```
CREATE TABLE user (id integer primary key NOT NULL AUTO_INCREMENT, fname
varchar(100) , Iname varchar(100) , role varchar(100))
```

CHAPTER 5

5.0. System Implementation and Validation

5.1. Introduction

The developed system constitutes of two main components that is the mobile and web-based application. The mobile application was to be installed on the farmers' mobile phones and the web-based system to run on a remote server.

The mobile platform of the system was designed using J2ME (Java 2 Micro Edition) and Java for the servlet classes.

The web-based application was designed using web technologies such as: HTML and CSS for the design, PHP as the scripting language to manage database queries, MySQL for the database,.

2. The agile methodology

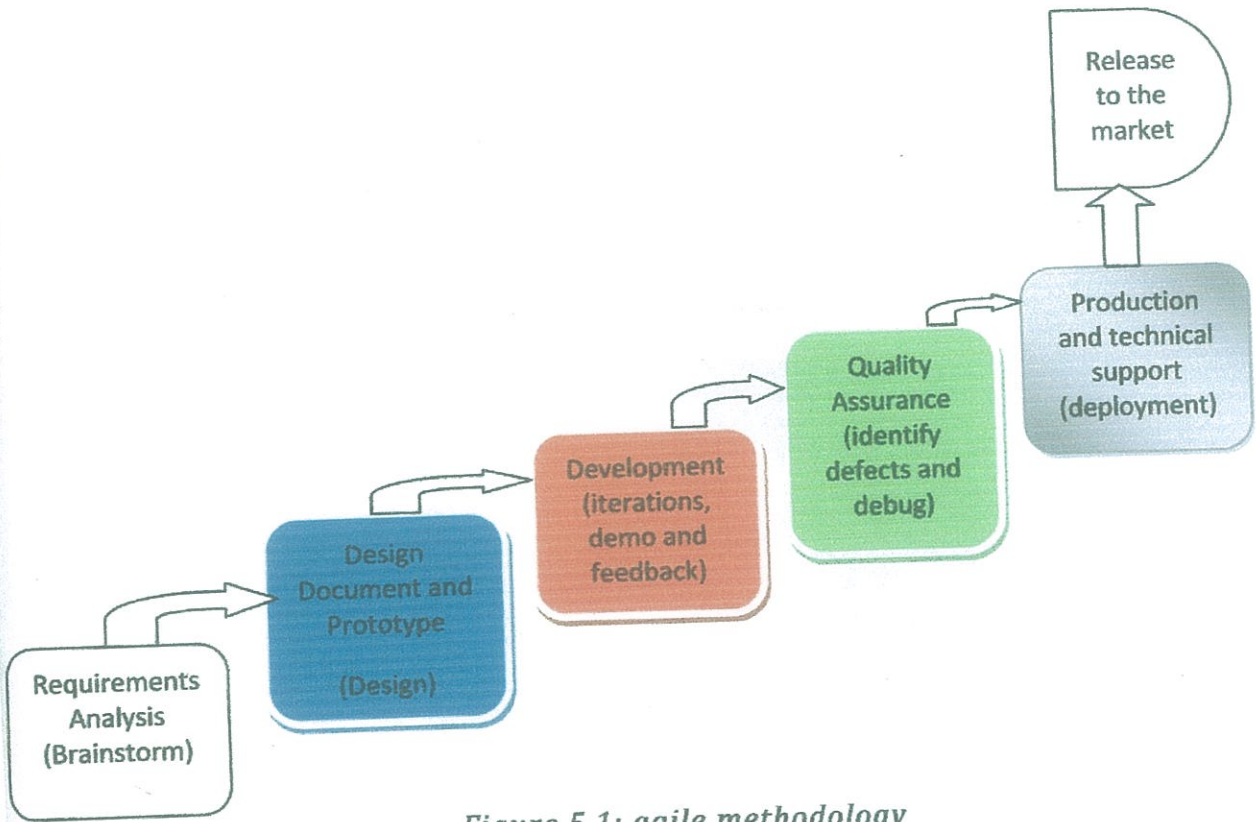


Figure 5.1: agile methodology

- 1) Requirement analysis also called brainstorm
- 2) Design Document & Prototype (design)
- 3) Iteration , Demo & feedback (development)
- 4) Identify defects & resolve bugs (quality assurance).
- 5) Production & Technical support (deployment).

5.3. User Interfaces

5.3.1. Mobile- based user interface

1. Myprice.

This functionality allows users to view markets; The system is only able to show a list of major markets in Kampala.

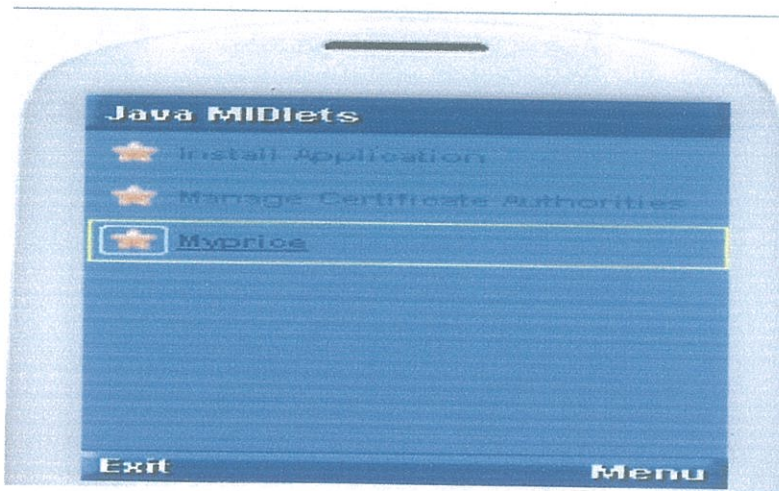


Figure 5.2: Myprice

Selecting a market by a farmer

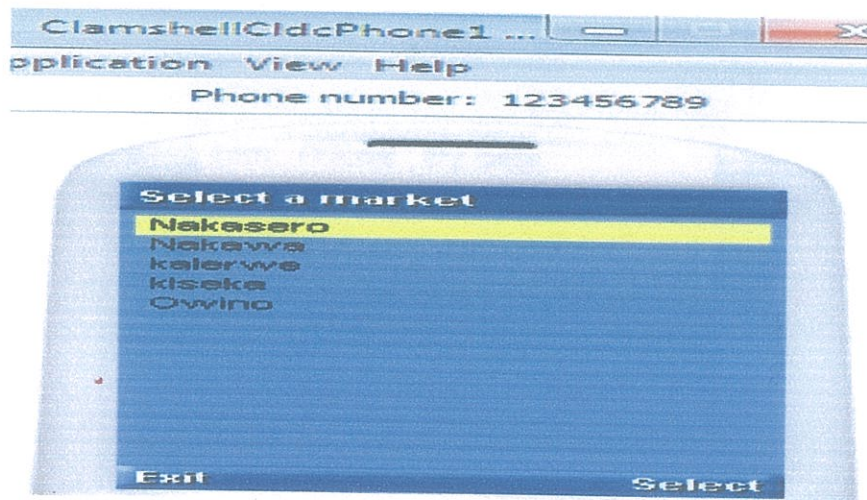


Figure 5.3: Selecting a market by a farmer

choice of the farm produce to be selected by a farmer from markets of figure 7.

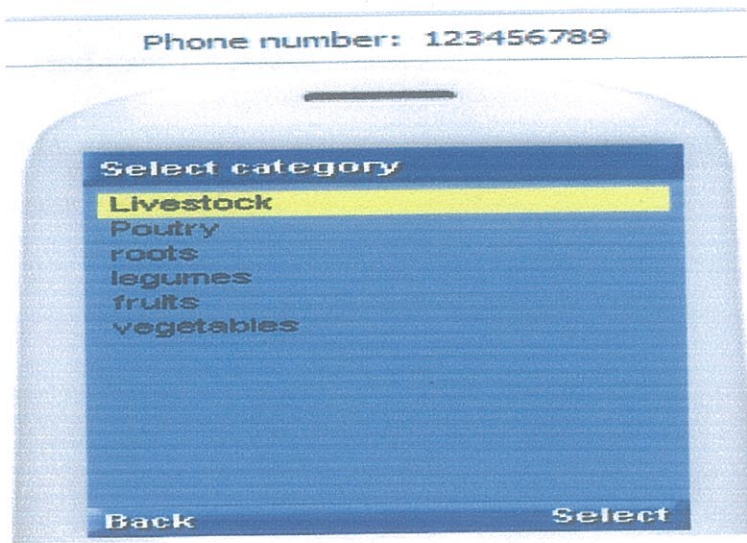


Figure 5.4: Choice of the farm produce

If the farmer chooses to select the market place they are interested in and they are able to view all the information available on the system for that particular market.

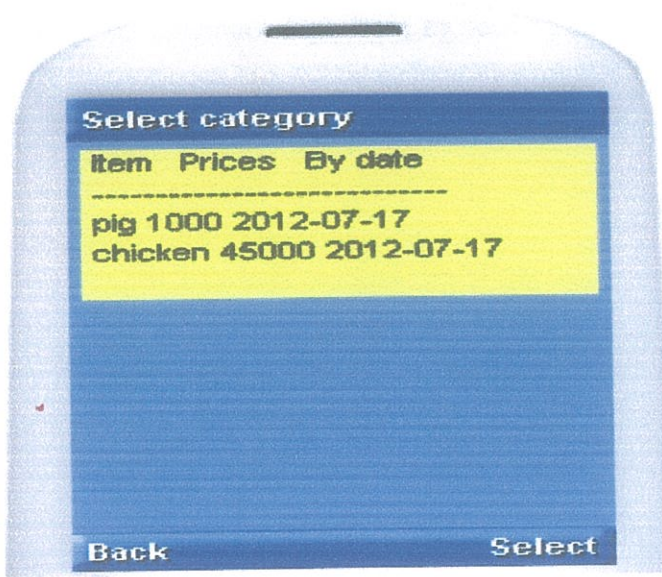


Figure 5.5: Select Category

5.3.2. *Web based user interface*

5.3.3.1. **Administrator Login**

It displays the administrator login page

Figure 10: Displays the administrator login page. It's where the user logs their usernames and their passwords then submit.

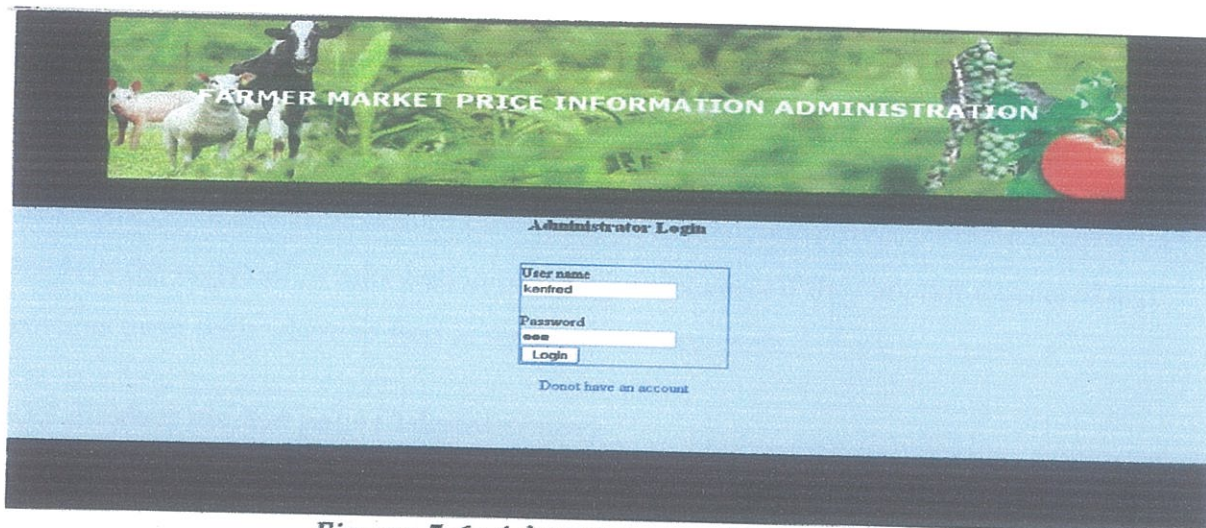


Figure 5.6: Administrator login page.

Displays a page where the administrator logs from by feeding in his or her username and password.

5.3.3.2. Administrator Registration Page.

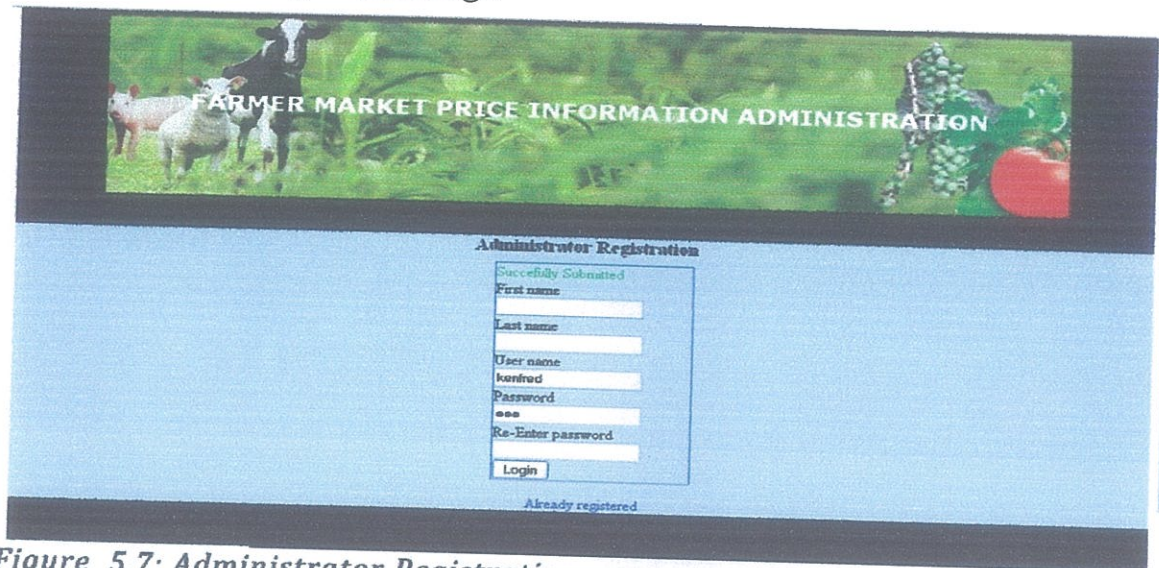


Figure 5.7: Administrator Registration page

Displays the registration information of the administrators if they are not registered and provides them with where to feed in their information from

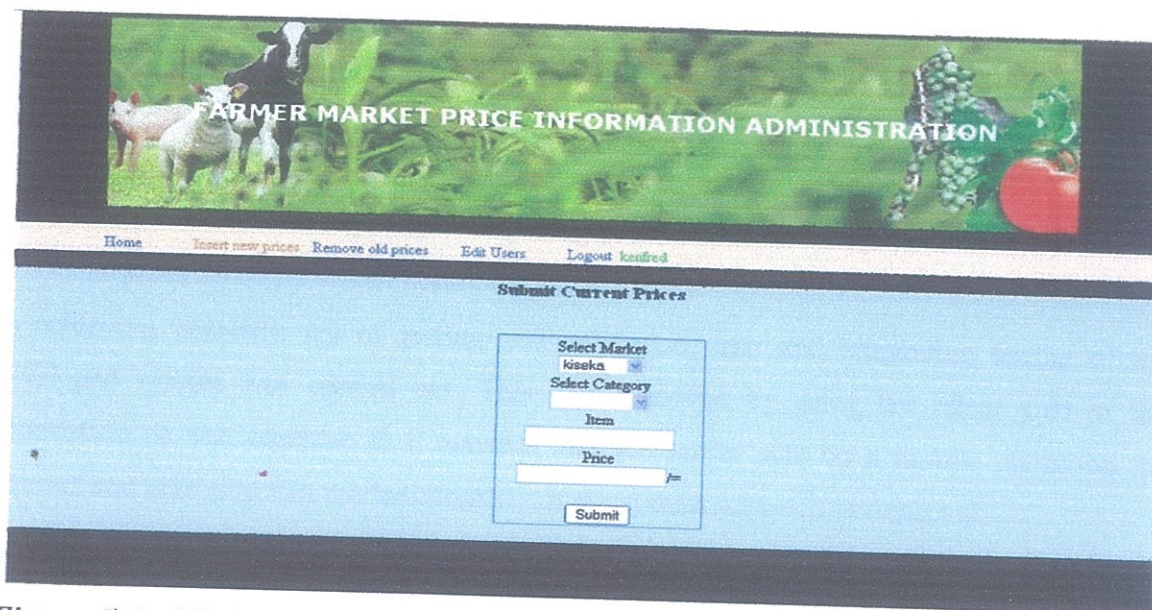


Figure 5.8: Administrator Registration page

Displays the market place and the category of the products you have, items and its price to be viewed by the farmers who choose where to sale their products.



Figure 5.9: Administrator captured item price

Displays the different produces in a given major market like Owino, their prices and an option to delete in case you want to modify the earlier entry of items or.

5.4. Testing and Validation

In achieving *objective (d)* of testing and validation, unit and integration testing of the developed system was carried out. This was achieved by using the client side of the application on one machine in a network and the server side on a mobile phone on the internet and verifying that the functionality of the system achieved as expected.

5.4.1. Unit Testing

This was done by the developers of different modules such as the mobile the Login module to check whether each unit met the required objectives.

This involved testing each module or class or functions identified in the system.

5.4.2. Integration Testing

This involved the studying of how two (or more) units work together within a system.

5.4.3. Usability Testing

This testing was showing whether the system was usable friendly and it was carried out when all modules had been integrated.

5.4.4. Acceptance Testing

This testing was done to ensure that the system had been accepted by the farmer in this case the farmers. This testing helped me to know whether the functionality of the system had been achieved and check for errors.

The validation was done through an experiment in an actual computer and mobile phone if available or a simulator where the system was deployed in a server and actual users were able to interact with the system and provided feedback.

5.4.5. Validation

When my supervisor tried to create his own account the way an administrator would at the NAADS, the system captured him correctly and each text field of login accepted the right inputs of my supervisor as seen above in figure.

CHAPTER 6

Findings, conclusions and recommendations

This chapter consists of results and findings of the system model developed, the recommendations and conclusion of the research carried out by this group.

6.0. Findings

During system testing and validation, we asked farmers a number of questions to find out whether the system meets their requirements. Some of the questions asked included the following:

Is the mobile application system easy to use?

This question was used to determine whether the system was easy/ difficult for the user to use.

Answer: 70% of the users said yes it is easy, 20 % not easy and the rest were not sure (10%). Therefore the system is easy since the biggest percentage of users say it is easy for them to use.

Is the system helpful?

During testing, users were asked this question in order to find out if the system is helpful and does what it is supposed to do.

Answer:

Yes = 80% Not helpful =20% . Therefore since the biggest percentage says it is helpful it is indeed helpful.

How often do you regret your decision to sell your produces without knowing the market prices of other market places?

Answer: many times sir

Therefore many farmers found the system effective to use and when asked if they would be willing to support the new system, they were very positive about it.

How do you compare the system to manual systems?

The new system was compared to the old system in terms of efficiency, portability, cost, accessibility and reliability.

Therefore, as seen in the findings above, it was established that the new system was easy to use, efficient, portable, cost effective, accessible, helpful and reliable.

6.2. Conclusions

This project is of great importance to the farmers as a means of knowing prices of their produce in different markets prior to selling them so as they can determine where to sell them. Students by then have information about this system, (Mobile farmer's agricultural information system). Due to time limitations however, the scope of the project was limited to the markets around the country (Uganda). But with expected success of the project in various regions, it is expected to spread to the rest of the countries.

6.3. Recommendations

Data collected from this system can be used for a numbers of statistical purposes and help in the inspection of the quality of service provided by Agricultural organizations. This data can also be useful to the farmers to help them get the best knowledge of the prices in different markets before selling their produces.

6.4. Future work

Further research is required in order to come up with a more advanced system that can enable Automatic moderation of information before it is assigned to the central database used by mobile users instead of administrators moderating. This will provide advancement in system efficiency. Furthermore, the system in future should be expanded to handle a wider range of services,

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Appendix 1: Budget Estimates

Item	Quantity rate	Amount
Stationery		200,000/=
Transport to the field Destination Villages @100,000		
Sub-total		300,000/=

Table 6.1 Appendix 1: Budget Estimates

This budget includes a feasibility study, mapping out the field as well as organizing and carrying out interviews.

Secretarial Services

Word processing (typing) And printing		50,000/=
Photocopying		20,000/=
Data analysis		200,000/=
Binding book 3	10,000@	30,000/=
Sub-total		300,000/=
Grand total		600,000/=

Table 6.2: Secretarial Services

Appendix II: Time Frame

	Activities	Month
1	Writing and submission of research proposal	Jan 2012
2	Collection of data	Feb 2012
3	Data analysis	March 2012
4	Writing research report	April 2012
5	Submitting research report	September 2012

Appendix III: Sample Interview Questions

1. How do you keep on updating the commodity prices and how do your clients get to know about them?
2. Do you think you could be losing clients or customers because they are not aware of the product prices in your market place?
3. Is the mobile application system easy to use if put in place?
4. If yes, why do you so?

Appendix IV: Sample Questionnaires

This questionnaire is used to collect information about the existing making system and the view of the users about the mobile-based farmer's information system.

Any information provided here shall not by any means be taken for granted and the participants shall by no means be exposed. Therefore the information provided is confidential.

Please tick where applicable and fill in some blank spaces. Thank you.

5. Age (Tick the range)

- (a) 12-25 (b) 25-36 (c) 36 above

6. Sex

- (a) Male (b) Female

7. How do you tell that a price of the producers in one market place is higher than the market price of another market place?

- (i)
- (ii)
- (iii).....
- (iv).....

8. Have you ever sold your products and after selling them you realize the price at which you sold your product was lower than the price of another market place?

(a) Yes (b) No

4(a) if yes, how did you find out?

(i)

(ii)

9. How often do you regret your decision to sell your produce without knowing the market prices of other market places?

(a) Very often (b) Less often (c) Not at all

10. There is a system that has been put in place to help the farmers be able to see the different prices of products in different market places, would do like it?

(a) Yes (b) No

11. If yes why do you think it would be a better

(i)

(ii)

(iii).....

(iv).....

12. How would you rate the new system?

From 1-10

.....

13. What advantages do you think the system has to you

(i)

(ii)

(iii).....

(iv).....