



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

P.O. Box 236, Tororo, Uganda
Gen: +256 - 45 444 8838
Fax: +256 - 45 4436517
Email: info@adm.busitema.ac.ug

www.busitema.ac.ug

FACULTY OF ENGINEERING

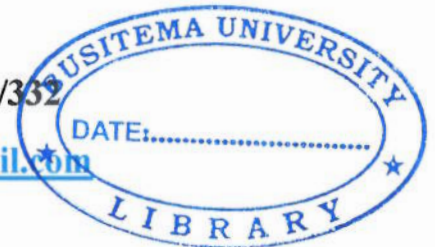
DEPARTMENT OF COMPUTER ENGINEERING

**WEB BASED APPLICATION FOR IRISH POTATO EXTENSION
SERVICES AND MARKETING**

CHELANGAT ISAAC BU/UP/2015/332

Email: chelangatkapmelkutisaac@gmail.com

Tel: 0704482440 / 0777380923



SUPERVISOR: MR. OCEN GILBERT

*A Final Year Project Submitted to the Department of Computer Engineering in
Partial Fulfilment to the award of Bachelor of Computer Engineering Degree of
Busitema University*

August 2019

ACKNOWLEDGMENT


My Supervisor, Mr. Ocen Gilbert who continuously guided me throughout this project. He has been a parent to me and provided where necessary especially the technical and major areas in my project, may God bless you and reward you so much. Mr. Arineitwe Joshua, Head of Department Computer Engineering, Busitema University and Madam Barbara for your guidance, may God bless you all abundantly.

Also, special gratitude goes to my father Mr. Kissa Mike, my mother Mrs. Cheptegei Lydia Kissa, my brothers and sisters: Kibet Caleb, Yeko Levi, Chepkwemboi Faith, Cherotich Charity, Chemutai Brenda and Kiprop Philan and My Uncles Mr. Kiprotich Abraham, Mr. Nyangus Walter and my friends who supported financially, materially, spiritually until the completion of this project, both indirectly and directly to see that I am successful in my studies all along since I started may God bless you.

Most important of all, the almighty God for the strength and good health during my project time and all the years through.

DECLARATION

I CHELANGAT ISAAC BU/UP/2015/332, do hereby declare that this Project is original work and has not been submitted for any other degree award to any other University before.

Sign  Date 2/07/2019

CHELANGAT ISAAC BU/UP/2015/332

Bachelor of Computer Engineering


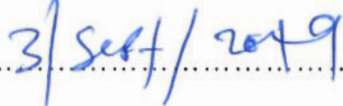
Department of Computer Engineering

Busitema University.



APPROVAL

The dissertation Report of the project title “Wed Based Application For Irish Potato Extension Services and Marketing” has been submitted with approval of the following supervisor.

Signature  Date 

Mr. Ocen Gilbert

Department of Computer Engineering

Faculty of Engineering

Busitema University.

ACRONYMS

XML	Extensible Markup Language
SOAP	Web Services Description Language
WSDL	Web Services Description Language
UDDI	Universal Description, Discovery, and Integration
W3C	World Wide Web consortium
URL	Uniform Resource locator
PHP	Hypertext Preprocessor
MySQL	My Structured Query Language
CSS	Cascading Style Sheet
HTML	Hypertext Markup Language

ABSTRACT

This report describes the design, development, implementation and testing of the web-based application for Irish potato extension services and marketing that can be accessed by both farmers and the extension workers to boost Irish potato farming in Uganda and beyond, the application has the functionality of working offline, creating an icon on the home screen, background synchronization and web push notification. The developed application is able to send information to the database where it is stored and then retrieved from the database and displayed on the web application in real time.

Table of Contents

ACKNOWLEDGMENT.....	i
DECLARATION.....	ii
APPROVAL.....	iii
ACRONYMS.....	iv
Table of Contents.....	v
Table of Figures.....	viii
CHAPTER ONE.....	1
INTRODUCTION.....	1
1.1 Background.....	1
1.2 Problem Statement.....	3
1.3 Justification.....	3
1.4 Study Objectives.....	3
1.4.1 General objective.....	3
1.4.2 Specific objectives.....	3
1.5 Significance.....	3
1.6 Scope.....	4
1.6.1 Geographical Scope.....	4
1.6.2 Technical Scope.....	4
1.6.3 Time Scope.....	4
CHAPTER TWO:.....	5
LITERATURE REVIEW.....	5
2.1 INTRODUCTION.....	5
2.2 WEB BASED SYSTEMS.....	5
2.2.1 Simple Object Access Protocol (SOAP).....	5
2.2.2 Web Services Description Language (WSDL).....	5
2.2.3 Universal Description, Discovery, Integration (UDDI).....	6
2.3 Irish Potato farming Technologies.....	6
2.3.1 Farm Preparation.....	6
2.3.2 Challenges faced by potato farmers.....	7
2.3.3 Handling and storage.....	7
2.3.4 Extension Services.....	7
2.3.5 Marketing.....	8

2.4 Related systems.....	8
2.5 Proposed System.....	9
2.5.1 Operation of the Application.....	9
2.5.2 Strengths of the Application.....	9
CHAPTER THREE.....	10
METHODOLOGY.....	10
3.0 Introduction.....	10
3.1 Requirements Elicitation /System Study.....	10
3.1.1 Data Collection Methods.....	10
3.1.2 Data analysis.....	11
3.2 Requirements Analysis.....	11
3.2.1 Functional Requirements.....	11
3.2.2 Non-functional Requirements.....	11
3.3 System Design.....	12
3.3.1 Tools Used to Develop the Application.....	12
3.3.2 Block Diagram.....	12
3.4 System Implementation.....	12
3.5 System testing and validation.....	13
3.5.1 Unit testing.....	13
3.5.2 Integration testing.....	13
CHAPTER FOUR.....	14
SYSTEM ANALYSIS AND DESIGN.....	14
4.1 Functional analysis.....	14
4.2 Requirements analysis.....	14
4.2.1 Functional Requirements.....	14
4.2.2 Non-Functional Requirements.....	14
4.3 Entity Relation Diagram.....	15
4.4 Data flow chart.....	16
4.5 Service Worker flow Chart.....	17
4.6 Database Design.....	17
4.7 Farmers Interface Design.....	18
4.8 Administrator Section.....	19

CHAPTER FIVE	20
IMPLEMENTATION AND TESTING	20
5.1 Development Platforms	20
5.1.1 HTML	20
5.1.2 CSS	20
5.1.3 JavaScript	20
5.1.4 JQuery	21
5.1.5 Bootstrap	21
5.1.6 Materialize UI	21
5.1.7 MySQL	21
5.1.8 PHP	21
5.1.9 SQL	22
5.1.10 XAMPP	22
5.1.11 Firebase	22
5.2 Code Design	22
5.2.1 Web App Manifest	22
5.2.2 Service Worker	25
5.3 Testing	26
5.3.1 Unit Testing	26
5.3.2 Integration Testing	26
5.3.3 System Testing	26
5.4 Verifications and Validation	27
5.5 Evaluations	27
CHAPTER SIX	28
DISCUSSIONS AND RECOMMENDATIONS	28
6.0 Introduction	28
6.1 Summary of the work done	28
6.2 Appraisal of the app	28
6.3 Recommendations for future work	28
6.4 Conclusion	29
References	30

Table of Figures

Figure 1 Block Diagram.....	12
Figure 2 Data schema Diagram.....	15
Figure 3 Application Flow Chart.....	16
Figure 4 Service Worker flow Chart.....	17
Figure 5 databases.....	18
Figure 6 User Interface.....	18
Figure 7 Administrator Dashboard.....	19

CHAPTER ONE

INTRODUCTION

1.1 Background

The United Nation estimates that the global population will rise from 7 to 9 billion by 2050, 1 billion is already hungry and food production must be increased by 70-100% if it is to feed this growing population. The addition of 2 billion people to the planet, largely in developing countries, requires a corresponding increase in food crop production, one that could be relatively achievable given that production increase of food crops such as maize, wheat, rice and Irish potatoes.[1]

The role of agriculture in economic development has long been recognized to play a unique role in reducing poverty and serve as an important engine for growth in developing countries. This is, in part, due to the sheer numbers of poor people engaged in it with around 75 percent of them surviving on less than US\$1 a day lived in rural areas in 2002 [2].

In Africa, nearly 60% of the total population live in rural areas [3] and depend on agriculture as the major livelihood strategy, it follows that raising agricultural productivity is the key to increasing real rural incomes, reduce poverty, increasing food security, addressing under-nutrition, and promoting more sustainable management of natural resources.

Improving agricultural productivity through extension services, however, requires expanding investments in agricultural research, technology development and delivery, extension, input and output markets, processing, institutional and policy innovations, training and capacity development[4]. The goals of agricultural extension include transferring information from the global knowledge base and local research to farmers, enabling them to clarify their own goals and possibilities, educating them on how to make better decisions, and stimulating desirable agricultural development in adoption of more productive technologies; seeds, fertilizers, agrochemicals, mechanization, etc. [5]. This involves adequate and timely access of relevant information to farmers. Thus, [6]extension services provide human capital-enhancing inputs, including information flows that can improve rural welfare as an important outcome recognized in the development dialogue[7].

The complexities of the agricultural production function imply that farmers need information on a variety of stages, before adopting a new technology this include: - seeding, preparing and planting,

References

- [1] C. M. Olson, "Symposium : Advances in Measuring Food Insecurity and Hunger in the U . S . and Hunger I," pp. 521–524, 1999.
- [2] P. A. R. E. Prest, (*I Nstitute of I Nnovation R Esearch of T He U Niversity of M Anchester*), no. December. 2004.
- [3] B. Cohen, "Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability," *Technol. Soc.*, vol. 28, no. 1–2, pp. 63–80, 2006.
- [4] J. N. Pretty, J. I. L. Morison, and R. E. Hine, "Reducing food poverty by increasing agricultural sustainability in developing countries," vol. 95, pp. 217–234, 2003.
- [5] A. W. Van den Ban, "Supporting Farmers, Decision Making Processes by Agricultural Extension," *J. Ext. Syst.*, vol. 14, pp. 55–67, 1998.
- [6] C. Laurent and M. Cerf, "Agricultural Extension Services and Market Regulation : Learning from a Comparison of Six EU Countries," vol. 12, no. 1, 2006.
- [7] J. R. Anderson and G. Feder, "Rural Extension Services," *Policy Res. Work. Pap.*, no. February, p. 33, 2003.
- [8] J. Aker, "Dial–A|| for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing countries," *Conf. Agric. Dev. Univ. Calif. Berkeley, Oct.*, pp. 1–2, 2010.
- [9] W. P. No, "Improving Productivity and Market Success of Ethiopian Farmers Commercialization of Ethiopian agriculture : extension service from input supplier to knowledge broker and facilitator Commercialization of Ethiopian agriculture : Extension service from input," no. 1.
- [10] F. O. R. D. Countries, *potato*. 2008.
- [11] A. R. Semana, "Agricultural Extension Services at Crossroads : present dilemma and possible solutions for future in Uganda," *Makerere Univ. Publ.*, 2002.
- [12] P. Compendium, "Post-harvest Operations."

- [13] S. Z. Ailian, T. Agriculture, and A. Husbandry, "Potato and gender," 2008.
- [14] S. D. and O. . V. Mukhwana. Eusebius, Dominic ., "Potatoes and Groundnuts in Eastern Uganda A Consultancy Report to Appropriate Technology Uganda," vol. 8435, no. May, pp. 81–128, 2005.
- [15] R. Tapscott, "Preventing Change and Protecting the Regime: Crime Preventers , Local Livelihoods, and the 2016 Ugandan Elections," no. April, 2016.
- [16] K. Kawachi, "An overview of the sociolinguistic situation of Kupsapiny, a Southern Nilotic language of Uganda.," *Afr. Study Monogr.*, vol. 31, no. 3, pp. 127–137, 2010.
- [17] B. M. L. Namwata, J. Lwelamira, and O. B. Mzirai, "Adoption of improved agricultural technologies for Irish potatoes (*Solanum tuberosum*) among farmers in Mbeya Rural district , Tanzania: A case of Ilungu ward," *J. Anim. Plant Sci.*, vol. 8, no. 1, pp. 927–935, 2010.
- [18] Volgent, "5 Web Services," *Distrib. Comput.*, no. Chapter 1, 2004.
- [19] I. Technology, "METEOR-S WSDI : A Scalable P2P Infrastructure of Registries," vol. 6, pp. 17–39, 2005.
- [20] P. Production, "Bohl, W. H., S. B. Johnson, eds. Commercial Potato Production in North America. Orono, Me.: Potato Association of America, 2010."
- [21] P. Guide, "Department of Forestry, Agriculture and Fisheries 2013," vol. 5.
- [22] R. Their and P. Losses, "Technical report : Improved Potato Harvesting Techniques," no. March, 2017.
- [23] L. Aliguma, D. Magala, and S. Lwasa, "The case of the Nyabyumba United Farmers Group in Kabale district," pp. 1–54, 2007.
- [24] *Use of Prosopis juliflora Seedpod as Livestock Feed Supplement in the Arid and Semi-arid Rangelands of Kenya*, no. January, 2014.