

**SCHOOL OF COMPUTING AND INFORMATICS**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**KWALE SCHOOL FEEDING PROGRAM MANAGEMENT SYSTEM**

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**THIS PROJECT IS SUBMITTED IN A PARTIAL FULFILMENT OF THE BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY DEGREE OFFERED IN THE DEPARTMENT OF INFORMATION TECHNOLOGY OF MOUNT KENYA UNIVERSITY**

## DECLARATION

I hereby declare that to the best of my knowledge no part of this work has ever been submitted for award of any qualification in this or any other University.

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I hereby declare that this is the original work of the student and has ever been submitted for award of any qualification in this or any other University.

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## ABSTRACT

The Kwale feeding Program Management System is a web-based application with offline features that aims to improve how the Kwale County currently manages its feeding programs efficiency, transparency, and accountability. The system will address the current challenges which include maintaining accurate records of beneficiaries, inefficient tracking of funds and programs performance. This system is intended to provide a flawless, efficient, and use friendly platform for administrators to manage and monitor the program.

The primary objective of the Kwale feeding program management system is to track funds from when they are being allocated to the communities to the disbursement, an up-to-date database of the beneficiaries as well as the generate detailed reports to the stakeholders i.e., the Non-Governmental Organizations (NGOs) in collaboration with county government and other government agencies.

In consideration for areas with limited internet connectivity, the management system will support web -based and offline functionalities with data synchronization capabilities when internet connection is available.

The current manual system is prone to errors and inefficacies resulting to mismanagement of resources and also takes a long period of time to compile crucial reports. Upgrading the manual system to a digital platform will enhance efficiency of the operations of the program. with data synchronization capabilities when an internet connection is available. The management system is scalable and user-friendly; it will help enhance transparency, better decision making and ensure the program resources reach the intended communities.

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## CHAPTER ONE

### 1.1 Introduction

Kwale County is one of the regions in Kenya that experience food insecurity as a result extreme climate change which has adversely affected agriculture and the livelihood of the people. The rising high temperatures has led to frequent drought seasons. Poverty has also been on the rise. The introduction of feeding programs has been key in reducing the effects of hunger and improve the nutrition of the vulnerable population. The beneficiaries of this programs are school children, low-income families and other vulnerable groups. However, this great initiative has experienced major challenges which include, lack of transparency, poor management of funds, inefficient tracking of the beneficiaries and the manual reporting procedures; which include manual registers to track beneficiaries, food distribution logs which are recorded using paper form ledgers, manual documentation of receipts and invoices.

To address these challenges, I have developed a web-based management system known as the **Kwale Feeding Program Management System.** This management system is designed to revolutionize the programs current manual mode of operations; providing a seamless and effective platform for the administrators and the stockholders. The system is designed to help the donors and the county government, overcome the challenges faced in the management of the programs operations. These current challenges as well as the limited availability of a tailor-made technical solution for the region, limits the full potential impact of the program

This project is unique in its approach as it addresses the aspects of limited internet coverage in some of the areas as well as shortage of technical personnel. The system is designed to provide both web -based and stand-alone offline applications. This will enable the programs management processes to be accessed easily in all the areas. It also provides tools to automate the tracking of funds, registration of beneficiaries and the performance analysis. The management system provides a secure, efficient and user-friendly platform for program administrators. This will improve the overall operations efficiency, transparency and data integrity.

### 1.2 Background Information

In recent years, there has been a significant rise of food insecurity in Kwale County in the Coastal region due to the extreme changes of the weather patterns resulting to low yield of crops. This region large population significantly depends on small scale farming, small -scale fishing and casual work, which has not been able to sustain the current growing population’s socio -economic needs. The introduction of the Kwale feeding programs initiatives funded by the donors, Non-governmental Organizations (NGOs) and government agencies was to mitigate the challenges of food insecurities and poverty affecting vulnerable groups which include school children, the elderly and the low-income households.

However, this noble initiative has experienced challenges with the current manual management approach which experience lack of transparency and inefficiencies. The system mostly relies on manual processes such as paper-based records for tracking funds, beneficiary’s data and food distribution. The outcome has been, inefficiency in fund tracking, inaccurate beneficiary’s data, inadequate monitoring and evaluation and challenges in coordination.

In response to these challenges, there has been a need to develop a comprehensive digital platform to streamline the management of the operations of feeding programs. This system should also be secure, effective, user- friendly. Another key factor to consider is the limited internet coverage in some of the remote areas.

The previous digital innovations for the management systems have experienced challenges in implementing online platforms in remote areas in Kwale which either have no internet or poor internet coverage and also limited equipment and technology infrastructure.

In order to address these challenges, I have developed a web-based digital platform with stand -alone offline capabilities known as the **Kwale Feeding Program Management System**. This system combines web-based functions for the overall management and stand-alone offline capabilities for usage in areas with poor or no internet access.

The features of the Kwale Feeding Management System, includes a centralized digital platform that integrates, beneficiaries tracking, fund management and reporting. This will improve the programs’ efficiency, transparency and also reduce risk of mismanagement by facilitating real-time data entry, creation of comprehensive reports and automatic updated. The stakeholders will have access to timely reports which are crucial in decision making.

This management system also provides a framework for managing social interventions which are transparent, efficient and sustainable.

### 1.3 Problem Statement

Initiatives for feeding programs in Kwale County has been played a crucial role in addressing hunger and food insecurities affecting low -income households and marginalized communities. However, these feeding programs’ inability to manage beneficiaries data, track funds and generate reports through paper-based process have hindered their ability to run efficiently and transparent. The major challenges include;

* **Poor management of funds:** The use of manual processes for tracking funds, expenses and payouts are prone to errors and inconsistencies. It is also challenging to verify if funds are used as planned because there lacks real-time visibility which could result to poor management and lack of accountability.
* **Inaccuracy of Beneficiaries Records:** The manual recording of the beneficiaries’ data is prone to inaccurate and redundant information. It’s difficult to ensure resources are distributed fairly to the right beneficiaries. It is also difficult to monitor the programs impact on the intended beneficiaries and track its progress/
* **Inaccurate and Delayed Reporting:** Manual generating of reports are time consuming and also prone to errors. As a result, it takes long in updating the stakeholders; the donors, program administrators and government agencies on the progress, performance and financial accountability.
* **Lack of Accountability and Transparency:** It becomes difficult for stakeholders to monitor how funds are being spend and whether it reaches its intended beneficiaries when there is no a centralized, automated mechanism in place. Future funding and support will become a challenge because of lack of accountability since it erodes the trust of funders and donors.
* **Restricted Coordination and Access:** It is challenging to coordinate activities across several feeding sites due to the county’s’ vast region with poor internet connectivity in remote areas. Administrators are therefore faced with the challenge of monitoring operations and making sure resources are effectively and equitably to all the regions.

### 1.4. Proposed Solution

To address the inefficiencies faced in the management of the Kwale County Feeding programs, I propose the development of a hybrid web based and offline standalone system known as the Kwale Feeding Program Management System (KFPMS). The system is designed to enhance the management, transparency as well as the efficiency of the Kwale County Feeding programs. Through the integration of key features that streamline that improve accountability and streamline operations, this system tackles challenges associated with manual program management.

The systems’ key features will include; Fund tacking tools which will make it possible to track funds, expenses, and overall financial performance in order to maintain accountability and prevent misuse of funds.

Automated reporting which will enhance the programs assessment and decision-making by generating comprehensive real-time reports for stakeholders.

Beneficiary management centralized database which will be used to register the beneficiaries, updating and tacking will help prevent duplications and guarantee fair resource distribution.

The Offline functionality is another feature that will allow the system to function in areas with poor internet coverage ensuring uninterrupted program administration even in remote areas.

The Kwale Feeding Program Management System, KFPMS is designed to be easy to use, with a user-friendly interface that makes it accessible to programs administrators with minimal technical expertise.

To protect the sensitive beneficiaries’ and financial information, the feeding program management system will provide user authentication and data encryption which will provide strong authentication processes and encryption.

### 1.5 Title Proposed for the Project

Kwale Feeding Program Management System.

### 1.6 Project Objectives

1. Create and implement a management framework that will improve Kwale feeding programs ‘accountability, effectiveness and transparency.
2. To track funds and monitor expenditure in real-time
3. Centralize and digitize beneficiary’s data to ensure equity and accuracy in resource distribution.
4. Generate real-time updates on financial and program progress and reporting.
5. Build a system with an online/offline feature that functions in areas with poor internet coverage.
6. Improve decision-making and reduce inefficiencies in the administration by using real-time analytics and automation.
7. To improve scalability and flexibility of the management system should there be a need for adding new features as well as adding other feeding programs in the future.

### 1.7 Project Scope

The Kwale Feeding Program Management System project specifications includes the development of a management system with both web-based and standalone offline functions that will solve the diverse needs of feeding programs in Kwale County.

The system has these key features;

1. **Fund Management:** The system will track funds, expenditures, and balances in real-time to guarantee accountability and transparency.
2. **Beneficiary Management:** The system will digitize beneficiaries’ registrations to provide accurate, updated and duplication free records.
3. **Digitized Supervision and Assessment:** The system will integrate features that will supervise the programs’ performance and progress; as well as generate real-time financial and activity reports.
4. **Offline Features:** The system will provide offline capabilities that will work well in remote regions with poor internet coverage.
5. **User Interface Design and Privileged Rights:** A user-friendly front end that is easy to use by the program administrators, donors, field officers and the government agencies despite of their different levels of technical proficiency. Every group will have specified privilege access rights.
6. **Data Privacy and System Integration:** Authentication of users and encryption of data will be used to protect sensitive information. Integrate synchronization with external infrastructure.
7. **Technical Training and Support:** Allocation of training sessions will be put in place for project administrators, field officers and stakeholders as well as ongoing technical support.
8. **Rigorous Testing, Deployment and Scalability:** Carry out rigorous system testing to determine the dependability of the system before it is rolled out in Kwale County. The system ability to improve in terms of adding new features or new programs will be put into consideration

### 1.8 Project Justification

The need for an effective and efficient feeding program management system has become of critical importance in the recent years, as Kwale County experience a rise in food insecurity and hunger. This is due to erratic weather patterns and drought affecting crop yields in Kwale County. Feeding programs have been vital in combating food insecurity and hunger among the vulnerable communities. However, this noble initiative, experiences challenges such as manual process, mismanagement of funds, beneficiary records are duplicated, reporting is delayed and restricted accessibility because of poor infrastructure, as a result, lowers the programs transparency, effectiveness and the overall impact.

The recommended Kwale Feeding Program Management System will solve the challenges faced by the current manual system by digitization of the core operations which will in turn improve the throughput, clarity, and trustworthiness in the how feeding program processes are carried out.

The Advantages of the Kwale Feeding Management System are;

1. **Optimization of Performance:** Minimal inaccuracies and streamlining the program operations.
2. **More Clarity:** Provide more clarity and openness using real-time tracking funds and reporting.
3. **Proportional Allotment of Resources:** provide precise records for beneficiaries that would assist in proportional allocation of resources.
4. **Prompt Decision Making:** Real-time generation of reports will help in making well -informed decisions by the stakeholders, on how to improve the programs operations.
5. **Easy to use Front End:** User -friendly interface that will accommodate all levels of technical proficiency among the stakeholders, field officers and administrators.
6. **Connectivity in Remote Regions:** Offline capabilities will enable the system to function in remote regions which experience poor internet coverage.
7. **Data Confidentiality and Compliance:** Provide strong security policies which will help protect confidential data building trust with stakeholders. Ensure regulatory compliance.

### 1.9 Project Risks and Mitigation

A Project is prone to a certain element of risks which may affect the success and deliverable. In light of this, the Kwale Feeding Program Management System is no exception.

The following are the key risks associated with the project and the mitigations that will be taken;

1. **Technical Risks:** These risks include hardware or software failures, system downtime, compatibility issues and security risks. To mitigate these risks, the system will undergo rigorous testing. The technical team will follow the best software practices for software development and security; provide regular system maintenance and address any technical issue that may arise.
2. **User Acceptance Risk:** Users may reject the new system due to poor design, lack of technical knowledge or fear of change. To mitigate this risk, the development team will rollout extensive trainings to the users, create user-friendly interface and work closely with stakeholders and user groups to help gather requirements and design the system based on the user feedback. Extensive testing of the system with a group of users will be conducted to ensure the system meets their needs and requirement.
3. **Time and Cost Risk:** These risks include the potential for the project to delay due to insufficient funding or budget overruns. To mitigate these risks, a detailed project plan will be created, I will oversee the meeting of the projects’ deadlines and budgets. Obtain funds pledges from stakeholders. The project outline will be periodically evaluated and modified to make sure unforeseen events are solved as soon as they occur.
4. **Data Security Vulnerabilities:** Inconsistencies might occur when transferring data from manual records to the digital management system. The possibility of unauthorized access to confidential information especially during the migration of data from manual system to the system. To tackle vulnerabilities, data quality checks will be carried out; verification and authorizing of users, encryption of data, and scheduled backup processes.
5. **Human Inaccuracies:** During development and implementation of the new system bugs can occur. To deal with these occurrences, project management and software development best practices is to be followed. Comprehensive testing will be administered before implementation to detect and rectify any inaccuracies

### 1.10 Proposed Project Budget

The estimated budget for the Kwale Feeding Program Management System should entail costs associated with the development and implementation of the system. This comprises of hardware and software costs, development activities, trainings, and any other expenditure related to the project.

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Quantity** | **Price per Item(Ksh.)** | **Total (Ksh.)** |
| **Hardware** |  |  |  |
| Laptops | 2 | 15,000 | 30,000 |
| Mobile Devices (6 Units) | 6 | 10,000 | 60,000 |
| Software Development | 1 | 40,000 | 40,000 |
| Internet Setup Connectivity | 1 | 10,000 | 10,000 |
| Training | 2 | 4,000 | 8,000 |
| Miscellaneous |  | 2,000 | 2,000 |
| **TOTAL** |  |  | **150,000** |

**Table 1.1 Budget**

### 1.11 Project Schedule

This project is set to start off in June 2025. The project will take a duration of 16 weeks to be completed.

In June the first 2 weeks from the 2nd to the 16th, I will conduct a requirement analysis by consulting the stakeholders to determine the project’s objectives, user requirements and systems’ needs.

System Design will be designed from week 3 from the 17th June to the 6th of July. Design the architecture of the system and database structure to facilitate scalability and effective data handling for both online and offline features.

The System Development will take place from week 6 from the 7th July to the 16th of August. In this phase, the hybrid web-based and offline system will be built while integrating the hardware and software feature.

Week 12 from the 17th August to the 6th of September the testing and execution will be carried out. Activities will entail, testing for bugs, faults and any operational challenges. Thereafter, the initial system rollout will be carried out in pilot locations.

In week 15, from the 7th to the 20th of September, training sessions and launching will take place. Users will be engaged in the scheduled trainings, and the system will be launched in all feeding program sites to streamline adoption.

## CHAPTER TWO: LITERATURE REVIEW

### 2.0 Past study of hybrid web-based feeding program management system

A digital web-based management system with offline functionalities has been a subject of numerous studies. Digitization of management systems has streamlined operations enhancing, efficiency, transparency and accessibility. SCOPE system (System for Cash Operations and Programme Electronification) developed by World Food Programme (WFP) launched in (2010s) was one of the worlds ’first extensive feeding program systems with Web-based and offline features. This beneficiary and transfer management platform, designed to monitor food distribution, registration of beneficiaries and resource allocation. The online and offline feature makes it possible for the system to operate in areas with poor or no internet coverage. The offline feature enables data collection and synchronization with the central database when internet connectivity is restored. Some of the limitations were, slow data synchronization, restricted scalability, inadequate training of local staff. Field devices didn’t have resilience for harsh environment, data inconsistences were frequent during the offline-to-online synchronization. There was also reliance on external vendors for hardware and software which limited its’ scalability and flexibility across different regions. (WFP. (2014; 2016).

The Hunger Safety Net Programme (HSNP), Kenya, a donor-funded initiative web-based management system with the Kenya government and the UK Department for International Development (DFID).The 1st phase was launched between 2007-2013, 2nd phase between 2013 -2019, 3rd phase from 2019 to present. The program aimed to provide financial support for vulnerable families in Kenya’s’ arid and semi-arid areas. The program is a web-based platform with offline features handles beneficiaries’ registrations, food distribution and cash transfers. The HSNP system key features include, beneficiary management, offline data collection, mobile device integration and synchronization capability. Some of the missing features are, real-time data Syncing, user friendly mobile applications, lacks advanced analytics and reporting tools.

**(Shem, J.** (2017); **Hobson, Campbell, Collins** (2019); **Development Initiatives** (2020).

The National Cash Transfer Program (NCTP) was another hybrid web-based system with offline features which was launched in 2018 by the Kenyan government in collaboration with the World Bank and UNICEF. This initiative was launched to streamline the management of cash and food aid distributed to the marginalized communities, orphans, the elderly and persons with disabilities in rural and urban areas with limited internet coverage.

The offline features, enabled the field officers to collect beneficiaries data using mobile applications on tablets and smart phones. The details collected were, food distribution details, the homes profiles and transactions records. These data were then kept locally and synchronized with the central database once the internet connectivity was restored. The program administrators were able to monitor, report and making decisions effectively due to the web-based, real-time functionalities of the program’s performance.

However, the systems faced limitations such as data inconsistencies which occurred during the synchronization of offline devices and the central database and also verification of beneficiaries. There were also the updates delays particularly in remote areas with intermitted internet connectivity. There was also the issue inadequate training for field officers on the systems management and mobile devices use.

(Kenya Government (2018); World Bank (2019)

The research study on Adoption of Hybrid Systems for Managing Food Distribution in Marginalized Communities in Kenya. This was a study by Mutua and Mwangi (2018) whereby they investigated the viability and the efficiency of hybrid web-based with offline feature, feeding program management systems, focusing on marginalized Turkana and Garissa counties.

The traditional approaches of managing feeding program management systems in these regions were not very effective due to poor internet coverage, persistent food insecurity and recurrent drought seasons. The study was used to determine how the hybrid systems with online and offline features would handle these existing issues. It focused on doner -funded feeding programs run by the Kenyan government and funded by international agencies such as World Food Program (WFP) and USAID. The hybrid system was used by the program to track the registration and verification of beneficiaries’ data, distribution and consumptions for food stocks as well as performance indicators which include efficiency, time punctuality and coverage. The features of the hybrid system had the following features, web-based platform that enabled centralized data stored, reporting and monitoring in urban settings, with offline capabilities; the offline features which enabled field officers in remote areas to register beneficiaries, monitor food distribution and log program information without internet. When internet connectivity was restored, synchronization of data was done from its local storage. Its efficiency was 30% compared to the previous paper-based system, cost effective and reached about of 90% of the population in the remote areas. However, the hybrid system had limitations which included synchronization of data from offline with the centralized database, device limitations due to few mobile devices used in the remote areas that lacked sufficient storage capabilities and inadequate battery life. The other limitations were, inadequate technology knowledge and internet connectivity issues. The proposed improvements were enhancing offline capabilities to handle large volumes of data and detect errors during synchronization, use of weather -resistant mobile applications suitable for harsh climates, biometric verification and regular training programs to improve the skills of the program administrators. This research study outlined a blueprint of expanding hybrid systems in different regions in Kenya and across Africa and the importance of the hybrid systems in areas with inadequate infrastructures. This study’s findings influenced the design of newer feeding program such as the Hunger Safety Net Program (HSNP) as well as other cash transfer programs. (Mutua, J., & Mwangi, K. (2018)

**Wanjiru, L., & Kamau, G. (2019)** carried out a study on Web-based and offline functionalities in the management of school feeding programs, focusing on how the hybrid system was used to oversee the school feeding programs in Nakuru county. This illustrated how well this system would track the food inventory, manage beneficiaries register as well as making sure of timely distribution. The offline feature helped with the data collection and synchronization when internet connectivity was available essential for schools in remote areas. There were drawbacks which were experienced and they included the incompatibilities with the low-cost devices and inadequate user training. Some of the proposed improvements included increasing the operational efficiency by optimizing systems for low-cost devices, enhancing offline features and carrying out regular trainings. The findings would be useful in addressing the operational and technical limitations in managing feeding programs making it a useful guideline for similar programs in developing regions.

**Ngugi, D., & Kiburi, C. (2019)** is another team of researchers who carried a study on “Digital solutions for Food Assistance Programs’, and the how these digital solutions would solve the issue of the network disparity in the rural areas in Kenya. They did their investigation on how the hybrid web-based with offline features system would help improve how the management of food distribution and aid programs in the rural areas in Kenya. This would facilitate real time tracking of funds, beneficiaries and food supply management. They looked at programs funded by World Food Program (WFP) and the Kenyan Hunger Safety Net Program (KSNP) which collected data offline in areas with internet connectivity and would later synchronize the data with the centralized databases once they had access to internet. As a result, the hybrid platforms increased transparency, efficiency and fraud was reduced. However, there were some short comings which included device security threats, delay in data synchronization from offline to online and outdated infrastructure. The suggested improvements included carrying out extensive training to the field officers, investment in mobile technology and the use of distributed digital ledger that would securely store records across a network and scalability of the hybrid solutions.

## CHAPTER THREE: METHODOLOGY

### 3.0 Introduction

The development processes of the hybrid web-based with offline feature, feeding program management system, will be governed with several sets of rules and procedures. I selected the Waterfall model for this project.

### 3.1 Waterfall Model

This model divides the systems’ life cycle into phases. Each phase has to be complete to move to the next phase. Each activity in this paradigm yields a well -defined product.

This model is also known as a linear sequential model, classical lifecycle mode or the phased lifecycle model. The waterfall model is used to depict the processes involved in the system development.

Waterfall Model

Requirement

Analysis

System

Design

Implementation

Testing

Deployment

Maintenance

#### 3.1.0 Limitations of the Methodology

In as much as the waterfall model was the most appropriate methodology for developing this system, it had the following drawbacks;

1. The waterfall model processes are linear rigid

The solution to this challenge will be to introduce feedback loops which will enable minor adjustments during the systems development. Ensure through documentation of requirement analysis has been done. Divide the project into modules such as offline data management and fund tracking. Every module will have its own waterfall cycle and it will be handled as a mini-project.

For scalability, the use of a scalable and modular architecture that can accommodate future improvements such as increasing more users, new features, without a need for a total redesign.

1. Delayed Deployment; this model requires that after every phase is complete, then full deployment will take place.

The solution for this limitation will be prioritizing crucial areas or functionalities and employ phased deployment.

### 3.2 Data Collection Methods

Different data collection methods could be used to gather information about the Kwale Feeding Program Management system. I choose the following 3 method;

#### 3.2.1 Questionnaires and Surveys

This method will entail, the development team creating a structured survey targeting the stakeholders who include the donors, government agencies, program administrators and also the beneficiaries. The questions on major on the user demands, technical capabilities and the current challenges facing the Kwale Feeding Program. In places where there is internet coverage, we will distribute the surveys online and in remote areas, the surveys will be conducted physical. This method is cost effective and it will also enable us to gather both quantitative and qualitative data.

#### 3.2.2 Interviews and Group Discussions

This will involve initiating group discussions with the beneficiaries and one -on -one interview with the program administrators will helps to yields detailed information on specific challenges. This method also assists in identifying user preference, common problems and potential obstacles to system adaptation. Another emphasis on why the remote areas require a system with offline capabilities.

#### 3.2.3 Observation and Field Visits

Site visits in the remote areas will help assess the existing framework, internet coverage and the mode of data collection. On ground observations on how the day-to-day process which entails how beneficiaries are registered, fund allotment, will give relevant information that will give the blue print on which offline properties are suitable for the remote areas.

### 3.3 Data Analysis

#### 3.3.1 Current System

The current system is a manual process that involves paperwork, for registration of beneficiaries, invoices for expenditures and physical documentation. The process is slow and time- consuming, leading to delay in decision making.

The current Kwale Feeding Management System has limitations, which include;

* **Poor management of funds:** The current system uses manual processes to track funds, resulting to errors, inconsistencies, lack of real-time visibility, reducing accountability.
* **Inaccuracy of Beneficiaries Records:** The current system uses manual recording of the beneficiaries’ data is prone to inaccurate and redundant information, making fair distribution and impact monitoring challenging.
* **Inaccurate and Delayed Reporting:** Thecurrent systems’ manual generation of reports are time consuming and also prone to errors and causes delays in updating stakeholders.
* **Untrustworthiness and Lack of clarity:** Without a centralized system there are challenges with trustworthiness and openness. As a result, there is a mistrust from the stakeholders which affects future funding.
* **Limited collaboration and Access:** It’s challenging to oversee operations as well as a balanced distribution of resources in remote regions with limited internet connectivity.
* **Susceptibility Data Breaches:** Datacanbe easily compromisedsince the existing system does not have sufficient protection of confidential data.

#### 3.3.2 Proposed System

The recommended systems’ objective is to overcome the drawbacks of the existing manual system on how in manages the beneficiaries’ records, fund tracking, reports and administration in different locations to implement an upgraded resolution to satisfy the requirements for this noble initiative. This system comprises of both web-base and standalone capabilities that will streamline day -to-day processes. The system is adaptable to the major browsers.

The recommended system will have two main components, i.e., the user interface and the back-end system. The user interface will provide users with an easy-to-use interface that will enable them perform tasks such as generating automated financial reports, registration and validation of beneficiaries. The system will also be able to handle large volumes of data and will have better scalability and performance than the current system. The back-end system will be tasks to handle all the processing and the database management required for the system to function correctly.

The recommended system will have key features which are not available on the current system. They will have the ability to automate beneficiary registration and validation to obtain accurate data, automated report generation to provide timely updates, a real-time fund tracking feature, security feature using role-based access control, encryption of data, audit trails, offline functionality which allows data synchronization when connectivity is restored.

The recommended system will be developed using incremental and waterfall methodologies. The approach will use the classic waterfall methodology with enhanced feedback loops in every phase to enhance scalability. This will also allow rapid development and testing of the user interface while ensuring that backend system is thoroughly tested and reliable. Overall, the recommended system will have a significant improvement over the current system providing a more reliable and secure platform.

#### 3.3.3 Requirements

For the recommend system to accomplish its mandate, it’s crucial to clearly establish and specify the prerequisite that must be met. The specified prerequisites will provide a base for the conceptualization and construction of the recommended system.

The following are the key requirements for the proposed system;

1. **Functional Requirements**

The proposed system should have features for, real-time fund tracking and expense management, automated beneficiaries’ registration and tracking, automated reporting and timely updates, offline data gathering and syncing with the central system, a centralized dashboard for monitoring and a role-based access and security feature.

1. **Non-Functioning** **Prerequisites**

The recommended system must be conceptualized with a malleable framework that will allow scalability in the future. It should be safeguarded with data encryption and context-based access controls. A user-friendly front-end platform that is adaptable on both online and offline functionalities. The system throughput performance should be customized remote areas with limited internet connectivity. The system should be adaptable to mobile devices.

1. **Technical Specification**

The recommended systems’ front-end built with a web-based front – end and MySQL database back end, incorporate of offline capabilities for remote areas with limited internet connectivity, and data backup and disaster recovery.

1. **Operation Prerequisites**

Training sessions for field officers, stakeholders and administrators will be scheduled as well as continuous system maintenance and updates.

By meeting these prerequisites, the recommended system will be well-furnished to deal with the drawbacks faced by the Kwale feeding program management.

### 3.4 Population of study / Target Population

The population of study for the Kwale Feeding Program System will be primarily involves the key stakeholders and users who are involved with the feeding program. This system is aimed at improving the efficiency, transparency and accountability of Kwale feeding program management.

The target population will include the doners, administrators, field officers, individuals and households of the beneficiaries. The system will be available to other feeding initiative programs in the coastal region and other regions in the country who would be interested in replicating the platform to manage their operations.

The study aims at understanding the users’ requirements and challenges that are encountered with this groups. This will help develop a system that is effective, user-friendly and flexible to accommodate various settings which includes areas with poor internet coverage.

### 3.5 Phased Dependent Tools and Techniques

#### 3.5.1 Automated Tools

I will use the following automated tools in my system development;

|  |  |  |
| --- | --- | --- |
| **PHASE** | **NAME OF TOOL** | **DEVELOPER** |
| Project Management | MS Project | Microsoft |
| Design | Figma | Adobe |
| Implementation /Coding | PHP Programming Language (Laravel Framework) | The PHP Group, Taylor Otwell |
|  | MySQL Database | MySQL AB |
|  | XAMPP Server | Apache Friends |

### 3.6 Tools and Techniques for designing and developing the System

#### 3.6.1 Database Tools

MySQL database will be the database used to manage data in the Feeding Program Management System. MySQL is the ideal database for the system with the help of the SL database management system (DBMS) because of its security and ability to hold large volumes of data.

#### 3.6.2 Programming Language

The languages to be used to design the web-based feeding program management includes;

**HTML**

HTML (Hypertext Markup Language) is the standard markup language which will be used structuring documents that are intended to be viewed in a web browser. Technologies such as JavaScript and CSS will also help to style the systems user interface for visibility and easy navigation and (Cascading Style Sheets) will also help add interactivity. This language will be used to construct the web-based feeding program management systems’ user interface; making sure the administrators and users are able to navigate the platform with ease.

**SQL**

SQL -Structured Query Language (pronounced as “ess-que-el”) is the standard language for relational database management systems, according to ANSI (American National Standard Institute).

This programming language will be used to create the database management system that will be used to manage, store and retrieve the data, enabling accurate record keeping and efficient reporting.

**PHP**

PHP (Hypertext Preprocessor) is a popular general purpose scripting language with the focus on web development

PHP is flexible, fast and a pragmatic programming language that drives blogs to the world’s most popular websites.

This code connects the web page to the database. It will control the database communication, server-side logic and data processing. This will streamline beneficiary management and fund tracking.

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