MINISTRY OF GENDER, LABOUR AND SOCIAL DEVELOPMENT

REPUBLIC OF UGANDA

Ministry of Gender, Labour & Social Development (MGLSD)

Expanding Social Protection (ESP) Programme

Social Assistance Grant for Empowerment (SAGE) Management Information System Enhancement

Closing Report

January 2024

DOCUMENT ACCEPTANCE AND RELEASE NOTICE

This is **Version 1.0** of the **Social Assistance Grant for Empowerment (SAGE) Management Information System Closing Report**. The report was produced for the **Ministry of Gender, Labour, and Social Development** by **Development Pathways** with technical support from **WFP**. This report is a managed document. For identification and amendments, this document contains a revision history, and each page contains a version number and page number. Changes will only be issued as a complete replacement document. Recipients should remove superseded versions from circulation. This document is authorised for release once the signature has been appended by an authorised representative of the **Ministry of Gender, Labour, and Social Development.**

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Date	Version	Description	Author/Reviewer
24th October 2023	1.0	Closing Report Initial Draft	Dorcas Wanza Mwathani
3rd January 2024	1.0	Updated closing report	Dorcas Wanza Mwathani

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ACRONYMS

API	Application Programming Interface
BRD	Business Requirements Document
DP	Development Pathways Ltd
ESP	Expanding Social Protection
MGLSD	Ministry of Gender, Labour & Social Development
M&E	Monitoring and Evaluation
MIS	Management Information System
NIN	National Identification Number
NIRA	National Identification & Registration Authority
ODK	Open Data Kit
PMU	Programme Management Unit
SAGE	Social Assistance Grant for Empowerment
TOR	Terms of Reference
SDD	System Design Document
SRS	System Requirements Specifications
TOT	Training of Trainers
UAT	User Acceptance Training
WFP	World Food Programme

A INTRODUCTION

Social Assistance Grants for Empowerment (SAGE) is a cash transfer programme operated by the Expanding Social Protection (ESP) programme under Uganda's Ministry of Gender, Labour & Social Development (MGLSD). SAGE has a well-established MIS (SAGE MIS) software and hardware infrastructure. The MIS is an automated mobile application and a web-based system that supports the operations of the SAGE programme and the broader ESP objectives. The SAGE MIS design and implementation has however evolved over time in line with changing SAGE programme requirements.

Under SAGE, the Senior Citizens Grant (SCG) programme has expanded across Uganda and there is a need to broaden its operational functions and redesign or enhance modules to improve usability and management functionalities to support on demand registration of SCG beneficiaries. This shall include but is not limited to developing a mobile application with the ability to work both on and offline. It is essential that the MIS has the functionality required by different stakeholders, including the tools required by operations, information, and alignment to ensure sound financial forecasting and accounting for funds, and standardised summary information for consistent client reporting. There is a need to ensure that the MIS is able to generate consistent data to meet these needs and avoid manual processes that could result in data variance.

To respond to SAGE programme evolving needs, the World Food Programme (WFP) in partnership with ESP has commissioned Development Pathways (DP) to upgrade the existing SAGE MIS software on the basis of detailed Terms of Reference (TORs) developed to support upgrades of the delivery system for the national cash transfer programme in Uganda. DP was required to design upgrades, develop, test, and support the deployment of the enhanced SAGE MIS.

This report therefore provides the activities of each workstream and the deliverables that were submitted as defined in the TORs. It does not aim to re-produce the deliverables as these are set out as separate outputs and have been shared with stakeholders for review. This report provides a summary of the deliverables status against what is set out in the TORs, defines the parameters for the maintenance phase and describes key risks, benefits and recommendations associated with the implementation of the SAGE MIS.

The report is broken down as follows:

i. *Section A:* provides the project introduction;

ii. *Section B:* presents the activities of the project workstreams and the deliverables;

iii. *Section C: presents the schedule of deliverables;*

iv. *Section D:* describes the maintenance and warranty plan;

v. *Section E:* sets out the benefits of SAGE MIS technology platform, lessons learnt, risks, conclusions, and recommendation

B PROJECT WORKSTREAMS AND DELIVERABLES

The assignment consisted of the following seven workstreams, namely:

B.1 Project planning and inception

This workstream entailed engagement with the client and relevant stakeholders and the development of a detailed plan for completing the project. There were three main outputs for this workstream: an inception report; (ii) a project management plan; and (iii) a risk management plan. Inception activities which included a detailed schedule of work, resourcing plan, revised methodology and inception workshop to discuss with stakeholders.

B.2 System analysis and design

This workstream entailed the systematic review of the Business Requirements Document (BRD) and high-level Software Requirements Specifications (SRS) which have been developed by ESP. Based on the background documents, we developed detailed software requirements, software design documents and a Quality Assurance Plan prior to commencement of the software development processes. Once the design was finalized, we reviewed and provided comments on the hardware and software infrastructure plan to ensure that it was appropriate for the needs of upgraded SAGE MIS.

The main outputs of this work stream include: (i) an updated Business Requirements Document (BRD); (ii) updated high-level System Requirements Specifications (SRS); (iii) an updated hardware and software infrastructure plan; (vi) a System Design Document (SDD); (v) a Quality Assurance Plan; and (vi) a Data Migration Strategy.

B.3 Upgrade of SAGE MIS software modules

This work stream entailed the translation of the BRD, SRS and SDD into enhanced software modules (web, Application Programming Interfaces (API) and mobile app components), ensuring that they underwent comprehensive quality assurance tests and deploying the solution on ESP SAGE environment. The key functions that were upgraded on the SAGE MIS include:
Reporting Module

- Pre-registration Module
- Targeting Module
- Enrolment Module
- Payments Module
- Case Management Module
- Complaints & Grievances Module
- Settings Module

The deliverables expected in this workstream were working software.

B.4 Testing and quality assurance

This workstream entailed the production of four outputs: (i) user acceptance testing report; (ii) updated manuals; and (iv) training reports. To be accepted by the client, the SAGE MIS upgrades had to meet all the mandatory functional and performance requirements specified in the to the satisfaction of the users.

B.5 Training and capacity strengthening

As per the TORs, capacity building was an important aspect of this project. As such, a training and system walkthroughs were conducted with the SAGE MIS technical team to empower them to use and support the enhanced SAGE MIS. The technical team will be responsible for the overall SAGE MIS administration and user management. Several internal users in ESP, for the case management and grievances modules were also identified to participate in the testing phases.

Training and capacity building activities conducted will enable the technical team to manage, operate and effectively use all the enhanced features of the SAGE MIS. Training and system walkthroughs were performed on the SAGE test environment.

The key capacity building workstream deliverables included: (i) operational Walkthroughs with the different users of the SAGE MIS (ii) ToT training; and (ii) technical walk-throughs with the SAGE MIS technical team.

B.6 System documentation

During this phase, the system documentations were updated, including the SAGE MIS user manual and the system administration manual for all functions in the SAGE MIS. The source code for the web and mobile application will be updated and shared during the maintenance periods after all the supports requests for the team have been updated in the system.

B.7 System support and maintenance

The workstream envisages the provision of remote post implementation support (warranty and maintenance) for one year. The warranty service will start immediately after the transition from the old SAGE MIS to the enhanced system. This activity is schedule for the week of November 27th – 1st December 2023.

The free warranty will cover a period of 12 months and technical issues will be resolved free of charge. The warranty services include correction of errors on the system, correction of problems with data, the provision of technical support in the configuration or adjustment of default parameters and re-training staff if necessary. Additionally, the firm will provide support to the Programme for a Pilot Rollout and Data Migration.

C MILESTONES AND DELIVERABLES SCHEDULE

The agile software development approach was strategically implemented for both the design and development phases of the SAGE Management Information System (MIS) enhancement. This approach ensured that the development of an enhanced software platform for SAGE MIS adhered to User Experience Testing (UET) standards.

Throughout the development phase, we conducted frequent meetings and discussions with the development team, stakeholders, and technical team. This open and collaborative approach ensured that everyone involved had a clear understanding of the project's progress and any changes that needed to be made.

By employing agile methods during both the design and development phases, we were able to foster a flexible and iterative approach to software development. This not only increased productivity but also enabled us to address any potential issues or challenges that arose along the way. By regular system walkthroughs and adhering to UET standards, we ensured that the final product met users' expectations while providing a seamless and user-friendly experience for all stakeholders and end-users.
The table outlines the milestones and deliverables that were delivered across the seven work streams.

No.	Milestone	Deliverable	Due Date
1	Inception and scoping activities	▪ Scope and inception report ▪ Updated Business Requirements Document ▪ Updated System Requirements Specification ▪ Updated software and hardware infrastructure plan	Nov 2022 – Jan 2023
2	Design Phase	▪ System Design Document ▪ Quality Assurance Plan ▪ Data Migration Strategy	Jan 2023 - Feb 2023
3	System upgrading activities	▪ Pre- Registration, Targeting, Verification, and Enrolment Modules. ▪ Payment Module. ▪ Case/Change Management, and Grievances Modules ▪ Reporting and Security Modules	March 2023 – July 2023
4	Quality assurance and training activities	▪ Quality Assurance Reports ▪ User Acceptance Test Report ▪ Post UAT validation Report ▪ Training Report. ▪ System Documentation	July 2023 – Oct 2023
5	Project closure	▪ Deployed SAGE MIS on production environment and handover of the source code and documentation	Oct 2023 – Nov 2023
6	System maintenance activities	▪ Maintenance and Warranty Agreement.	Dec 2023 – Nov 2024

D MAINTENANCE AND WARRANTY PLAN

According to the SAGE MIS TORs, warranty and support must be provided by Development Pathways for **24 months**, after sign-off of the closing report. As such, Development Pathways shall set aside resources to maintain SAGE MIS especially fixing bugs – that may not have been addressed during UAT exercises – and provide support to the ESP based on the maintenance and warranty terms. The framework for implementation of the maintenance and warranty plan is described in the following sections.

D.1 Scope of maintenance and warranty service

The warranty service shall include the following categories of services:

i. Corrections of errors on the deployed SAGE MIS.
ii. Resolution of all problems arising with the data because of an erroneous function of the SAGE MIS.
iii. Support in the configuration of the SAGE MIS, or adjustment by changing default parameters.
iv. Provision of necessary technical assistance to trained staff and re-training if it is disclosed that they cannot solve all problems after receiving training.

D.2 Roles and responsibilities of the client and developers

The maintenance and warranty phase will require close collaboration between the developer (Development Pathways) and client (ESP) to ensure that the SAGE MIS is fully functional. The developer warrants to undertake the following roles and responsibilities:

- Provide technical support for the administrators of SAGE MIS based on established support framework set out in the SLA.
- Fix issues arising due to malfunctions in the system at no additional cost.
- Adjust parts of the SAGE MIS that have been affected by a change in some other part of the system, such as changes of the hardware or the operating system.
- Making functional enhancements to the SAGE MIS to increase the system's performance even when the changes have not been suggested by faults.
- Perform activities to prevent errors by reducing the software complexity, improving software understandability, and increasing software maintainability (for example, documentation updating, code optimization, code restructuring, etc.).

To ensure full functionality of the SAGE MIS, ESP (the client) is expected to perform the following roles and responsibilities:

- Document the specific error message, how the problem or error is manifested, whether it is possible to recreate the problem or error, and the circumstances under which the problem or error occurred and log the error using JIRA support framework using login credentials supplied by Development Pathways.
- Provide necessary hardware and software environment and the means necessary for performance of the maintenance (including but not limited to offices, services, and equipment).
- Operate and administer SAGE MIS in accordance with the documentation provided and any user procedures.
- Maintain the SAGE MIS documentation in good condition and accessible to the SAGE MIS users.

- Provide a suitably qualified person or persons to act as the System Administrator and perform initial diagnosis of any problems encountered so that they are properly explained to the consultants.
- Maintain the server and client/workstation hardware, network infrastructure (both hardware and software), computer peripherals and any other hardware and software necessary for the normal operation of the SAGE MIS in good working order and condition.
- Ensure that appropriate precautionary measures are taken to cover against failure or malfunction of the Server and client/workstation hardware, network infrastructure (both hardware and software), computer peripherals and any other hardware and software necessary for the normal operation of the SAGE MIS.
- Maintain security copies (back up) of the SAGE MIS as well as data in machine readable form.
- Implement appropriate recovery measures in case of failure or malfunction of the server and client/workstation hardware, network infrastructure (both hardware and software), computer peripherals and any other hardware and software necessary for the normal operation of the SAGE MIS. As a minimum this entails regular data back-up, maintenance of emergency repair disks and operating system boot disks and maintenance of back-up copies of the SAGE MIS application data and software.
- Ensure that no configuration changes are made to the SAGE MIS by persons other than the consultant's staff or the authorised client's staff. In case the authorised client's staffs makes configuration changes, these changes should be communicated to the consultant in writing and approved by consultant in writing before the changes are carried out.
- Comply with the third-party software – such as Microsoft SQL Server, SSL certificate and Windows - licensing arrangements throughout the duration of this maintenance period so that such software licensing arrangements remain in force throughout the warranty period.

D.3 Software components to be supported

The warranty and maintenance shall be provided for the deployed SAGE MIS consisting of three software components:

i. SAGE MIS Web application
ii. SAGE MIS Mobile application.
iii. Application Programming Interfaces (APIs).

D.4 Support Hours

Support can be requested and provided within the normal working hours. Normal working hours for the purposes of SAGE MIS maintenance shall be considered between 8 a.m. and 5 p.m. every day, excluding weekends and public holidays in Kenya. Support will be requested by **emailing Development Pathways Support Administrator DTsupport@developmentpathways.co.uk** or telephoning **+254 (0) 20 2600 501 or logging issues on JIRA account**. In circumstances where this is not possible, direct contact to the designated support engineer will also be adequate. This should however be followed with official communication in writing to the designated representative for SAGE MIS support services as soon as possible. SAGE MIS users are highly encouraged to log all issues on JIRA support platform based on accounts to be provided by Development Pathways to ensure systematic resolution, management visibility and better coordination of support.

D.5 Response Time

Development Pathways response time will be based on the priority levels of the support request. The service requests or incidents will be classified according to priority levels described in the **priority levels enumerated in Table** 1: Priority Levels**2.**

Table 1: Priority Levels

Priority Level	Description
High Priority Defects	i. The SAGE MIS is completely non-functional. ii. It is impossible to access data in the database via the System. iii. It is impossible to execute *Critical processes*. iv. Incorrect treatment of data in *Critical processes.* v. Where one or more problems or errors results in the operation of the Software being impossible.
Medium Priority Defects	i. It is impossible to execute *non-critical* processes when there is no temporary solution. ii. Incorrect treatment of data in *non-critical* processes. iii. Non-critical is defined as malfunction of any one functional area within the System such that it is impossible to post transactions or obtain reports, and where a work around cannot be found. iv. Request for a missing component/feature which was in the initial requirement
Low Priority Defects	i. Inquiry, meeting the conditions of a medium priority Level inquiry, when there is a means of temporarily eliminating the defect. ii. It is necessary for ESP to change its existing activity process to execute SAGE MIS supported operations. iii. Insufficient documentation provided with the SAGE MIS, making it impossible to completely implement the functional features described in the system requirements specifications.

D.6 Priority Level Timetable

Timetable for executing maintenance and support procedures for the system is presented in the **Priority Level Timetable**. All issues raised shall be categorised based on the priorities as presented in Table 2: Prioritisation Schedule3.

Table 2: Prioritisation Schedule

Priority Level	Acknowledgement of the problem (email / telephone)	Commence Problem Resolution	Problem Resolution	Defect Elimination	Closure
High	1 hour	2 Working hours	1 Working Day	2 Working days	5 Working days
Medium	1 hour	12 Working hours	2 Working days	5 Working days	14 Working days
Low	1 hour	48 Working hours	4 Working days	10 Working days	30 Working days
Request for a new development or enhancements	1 Day	2 Working days	**Decision to be made by the Change Management Committee**		

Problem Resolution – is a work around to solve the problem so that the system can be brought up functioning.

Defect Elimination – resolution to the problem.

Support requests will be made as follows:

i. Each support request will be recorded, acknowledged, and queued by Development Pathways support help desk. Support requests will be queued in accordance with the priority level allocated.

ii. Development Pathways support administrator shall keep SAGE team informed of the progress in problem or error resolution by email and will endeavour to give estimates of how long resolution may take.

Development Pathways will offer support and guidance for authorized modifications aimed at maintaining system functionality and reducing potential issues. However, shall not accept responsibility for any issues resulting from modifications made to the system without prior notification to our technical team such as:

i. SAGE MIS user modifications of key system configuration or source codes without informing the technical support team.

ii. Installation of any software that is owned or licensed by someone else that was not part of the requirements for the operation of the SAGE MIS without the knowledge of the technical support team.

iii. Installation of software tools and accessories other than the software products that were installed at the set-up of SAGE MIS that might affect the functioning of the system.

iv. Changes made without knowledge of Development Pathways to the hardware, software or network after the software was installed.

v. Installation or use of the SAGE MIS software components without following the documented installation procedure.

vi. Damage by virus, trojan or other malicious code (unless it was introduced to the system by the software).

vii. Data loss due to failure to secure the SAGE MIS using minimum pre-requisites such as firewalls, SSL certificates, backups etc.

viii. Administrator or user error.

D.7 System enhancements and change control procedure

It is acknowledged that besides the potential SAGE MIS defects (such as glitches, errors, bugs, and malfunctions), the system from time to time during the maintenance phase, may require to be enhanced or changed due to multiple factors such as changes to programme design parameters, redesign of programme functions, government legislative and policy changes, and changes to the operational delivery of the programme. Any change to SAGE programme that does not conform to the built-in functions of the software should be logged into the JIRA support platform based on the login credentials to be supplied by Development Pathways. Any issue that is submitted by users using emails, WhatsApp, and Skype or even phone call shall be logged into JIRA by DP focal person and an acknowledgement email submitted to the SAGE MIS System Administrator.

To ensure that the issues logged into JIRA as change requests are controlled, a Change Management Committee (CMC) shall be established to govern the maintenance phase of the SAGE MIS and specifically control the change requests. The CMC shall consist of representatives of Development Pathways, WFP and ESP and shall be chaired by the Head of the ESP (or a delegated representative) who shall act as the overall Project Manager for the SAGE MIS. The committee shall hold regular fortnightly meetings where an issue log (downloaded from JIRA) shall present and discussed, and way forward agreed. The governance team shall assess the changes/issues with considerations for TORs, scope of work as set out in the SRS, maintenance phase contract requirements, project timelines, costs, impacts on built features, resource effort, timelines for implementation etc.

Based on the decision of the change management committee, an action plan shall be developed for the issues that are approved for implementation. The decisions of the committee shall be considered final and will consist of principally three options:

i. Decision to drop the change request.
ii. Decision to modify the requirement and recommend partial implementation of the change request.
iii. Decision to implement the requirement as set out in the change request.

E LESSONS AND RECOMMENDATIONS

E.1 Lessons

1. Estimating time accurately is a constant challenge in the world of software development. It's not as simple as it seems - even seemingly minor updates can unexpectedly introduce bugs, fixing one bug may inadvertently create new ones, and APIs may not function as intended. This serves as a constant reminder that everything in software development takes longer than initially anticipated. Therefore, it is crucial for developers to take into account these potential setbacks when estimating project timelines, ensuring that they allocate sufficient time for troubleshooting and bug fixing.

2. Despite our team's best efforts, bugs are an inevitable part of the software development process. No matter how meticulous our planning and testing, there will always be instances where unforeseen issues arise. However, with each interaction we have with the system, we become more adept at identifying these bugs and addressing any gaps in functionality. Rather than waiting for a perfect bug-free system, a more efficient approach is to have a robust system in place that allows us to promptly troubleshoot and fix any issues as they arise. This iterative process of continuous improvement ensures that we are constantly refining and enhancing our software, making it more stable and reliable over time.

3. When it comes to effective communication within a software development team, virtual discussion sessions have proven to be highly advantageous compared to relying solely on email correspondence. Whether it's providing training on new features or addressing an issue that requires collaborative problem-solving, these live discussion sessions offer a quicker and more efficient means of communication. Unlike lengthy email threads or back-and-forth chats, virtual discussions enable real-time interaction and immediate clarification of any doubts or misunderstandings. This not only saves valuable time but also fosters better teamwork and collaboration, as team members can engage in dynamic conversations that encourage active participation and the exchange of ideas.

E.2 Recommendations

1. The SAGE technical team should offer training sessions and provide documentation to SAGE users, informing them about the recent changes made to the system. This will ensure a seamless transition for the users.
2. It is important to provide operations training to SAGE users, enabling them to comprehend the rationale behind the system's design. This will facilitate their understanding of how the system functions and how to utilize it effectively.
3. Regular training sessions should be organized for SAGE users to enhance their knowledge and understanding of the system. This continuous learning approach will help users stay updated with any new features or enhancements introduced to the system.