



rural development
& agrarian reform

Department:
Rural Development & Agrarian Reform
PROVINCE OF THE EASTERN CAPE

DEPARTMENT OF RURAL DEVELOPMENT AND AGRARIAN REFORM

System Development Life Cycle (SDLC) FRAMEWORK

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1. DEFINITIONS

Terminology/Acronym	Definition
DRDAR or the Department	Department of Rural Development and Agrarian Reform
System Developer	Write code for computer programs and mobile applications. They also are involved in maintaining, debugging and troubleshooting systems and software to ensure that the system is running smoothly.
Business Owner	The specific Unit within DRDAR for which the system is built for.
Business Analyst	Responsible for bridging the gap between IT and the business unit using data analytics to assess processes determine requirements and deliver data-driven recommendations and reports to executives and stakeholders.
Database Administrator	Make sure that data analysts and other users can easily use databases to find the information they need and that systems perform, as they should. Oversee the development of new databases. They have to determine the needs of the database and who will be using it

2. ACRONYMS

Terminology/Acronym	Definition
SDLC	System Development Life Cycle.
IT	Information Technology
ICT	Information Communication Technology
SUT	System Unit Testing
UAT	User Acceptance Test
COBIT	Control Objectives for Information and Related Technologies
GITO	Government Information Technology Officer

3. EXECUTIVE SUMMARY

The Government Information Technology (GITO) has set ever-higher standards for the management and performance of Information Technology (IT) investments within the Department of Rural Development and Agrarian Reform (DRDAR). Those standards require IT programs and projects to achieve consistently successful outcomes that maximize alignment with business objectives and meet key cost, schedule and performance objectives.

A key to successful IT management is a solid program and project management methodology that incorporates best government structure for planning, managing and overseeing IT programs and projects over their entire life cycle.

The quality of IT investments is directly proportional to the quality of the management processes used to acquire and operate the IT products those investments produce. This document is the Department of Rural Development and Agrarian Reform's (DRDAR) System Development Life Cycle (SDLC) policy and standards guidance.

4. INTRODUCTION

One of the roles of Government Information Technology (GITO) is to ensure automation of manual business process. The Systems Development Life Cycle (SDLC) is a sequence of steps that must be followed in order to translate business requirements into an Information Technology (IT) system or application and to maintain the system in a controlled method.

This document serves as an instrument to assure that systems under development satisfy the user's requirements, within determined cost, schedule and quality guidelines. It provides a structured approach to managing information systems programs and projects beginning with establishing the need for a systems development or maintenance effort of the system.

5. PURPOSE

The purpose of the Systems Development Life Cycle (SDLC) Policy is to describe the requirements for developing and/or implementing new software and systems at the Department of Rural Development and Agrarian Reform (DRDAR) and to ensure that all development work is compliant as it relates to any, and all regulatory, statutory, and /or state guidelines.

6. REGULATORY FRAMEWORK

The policy was developed with the legislative environment in mind, as well as to leverage internationally recognised ICT standards. The following legislation, among others, were considered in the drafting of this policy:

- 6.1. Control Objectives for Information Technology (COBIT) 5, 2012.
- 6.2. Promotion of Access to Information Act, 2000(Act No.2 of 2000 (as amended)).
- 6.3. Protection of Personal Information Act, No. 4 of 2013
- 6.4. National Archives and Record Service of South Africa Act, 1996.

6.5. Electronic Communications and Transactions Act, 2002.

7. GOALS

The goals of this SDLC approach are to:

- 7.1. Deliver quality systems which meet or exceed business expectations when promised and within cost estimates.
- 7.2. Provide a framework for developing quality systems using an identifiable, measurable, and repeatable process.
- 7.3. Establish a project management structure to ensure that each system development project is effectively managed throughout its life cycle.
- 7.4. Identify and assign the roles and responsibilities of all involved parties, throughout the system development life cycle.
- 7.5. Ensure that system development requirements are well defined and subsequently satisfied.

8. OBJECTIVES

The objective of this policy is to:

- 8.1. Establish appropriate levels of management authority to provide timely direction, coordination, control, review, and approval of the system development project.
- 8.2. Ensuring project management accountability.
- 8.3. Documenting requirements and maintaining trace ability of those requirements throughout the development and implementation process.
- 8.4. Ensuring that projects are developed within the current and planned information technology infrastructure.
- 8.5. Early identification of project risks

9. CRITICAL SUCCESS FACTORS

The intention is to align system development with business needs. System development projects are customer focused and customer guidance and participation is required.

The following are basic principles of system development supporting this policy:

- 9.1. Collaboration between the business stakeholders and system developers throughout the project – better decisions are made when the business and technical team are aligned.
- 9.2. Support, trust, and motivate the people involved – motivated teams are more likely to deliver their best work than unhappy teams.
- 9.3. Enable face-to-face interactions – communication is more successful when development teams are co-located.

9.4. Working software is the primary measure of progress – delivering functional software to the customer is the ultimate factor that measures progress.

10. SCOPE OF APPLICABILITY

This policy applies to all DRDAR information technology development as defined in ICT Solution Acquisition SOP.

11. POLICY COMPLIANCE

Failure to comply with the provisions of this policy will result in disciplinary action taken.

12. SYSTEM DEVELOPMENT LIFE CYCLE PHASES



The DRDAR's SDLC policy includes seven phases, during which defined work products and documents are created, reviewed, refined, and approved. Not every project will require that the phases be subsequently executed and may be tailored to accommodate the unique aspects of a project. These phases are described in more detail in the following paragraphs.

11.1. INITIATE PHASE

In this phase, a request for automation of business requirements or modification of an existing system (which could range from a bug fix to a new system) is received, evaluated and, if deemed feasible, a business case or change request is created, depending on the nature of the request.

If it is a major change, the Information Gathering Phase is initiated.

Deliverable	Responsibility	M = Mandatory PD = Project Dependent
<p>Automation of Business Process</p> <p>Business Case –</p> <ul style="list-style-type: none"> A business unit evaluates the daily tasks that must be performed to achieve the departmental mandate, together with the challenges that are presented by the process. 	<p>Business Owner</p> <p>Business Analyst</p>	<p>M</p> <p>PD</p>

<ul style="list-style-type: none"> • The business unit presents to ICT the process challenges faced by the unit and together draw up a Business Case that will be presented by the Business Unit to the ICT Strategic Committee for endorsement. • After Business Unit has obtained endorsement for the ICT Strategic Committee, ICT collects information relating to the process challenges and research on existing systems in the market that may be responsive to the challenge. <p>Feasibility Study Document -</p> <ul style="list-style-type: none"> • ICT presents the potential solution to the business unit that is experiencing process challenges. • Business Unit review the solution presented by ICT and decides to accept the solution or decline the solution. • Upon the approval of the proposed Feasibility Study Document solution by business unit, ICT conduct User requirements gathering with the business unit and draws up a detailed specification of the solution to be developed and submit to the business unit for sign-off. <p><u>Modification of existing system</u></p> <p>Change Request - The Business Owner will complete and submit to ICT a “Change Request” form that will explicitly describe the</p>	<p>Business Owner Business Analyst</p>	<p>M M</p> <p>M</p>
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<p>modification that is required from their existing system.</p> <p>ICT Project Leader together with the Business Owner and the ICT Strategic Committee will convene to determine if the change is feasible or not. When the Change Request form is approved, ICT will then initiate the SDLC phases.</p>	Business Analyst	PD
	Business Owner	M
	Business Analyst	M
	ICT Project Leader	M
	System Developer	M

11.2. INFORMATION GATHERING AND ANALYSIS PHASE

This phase formally defines the detailed functional user requirements using high-level requirements identified in the Initiation and Feasibility Phases. The requirements are defined in this phase to a level of detail sufficient for systems design to proceed. They need to be measurable, testable, and relate to the business need or opportunity identified in the Initiation Phase.

The purposes of this phase is to:

- a) Complete business process reengineering of the functions to be supported, e.g., verify what information drives the business process, what information is generated, who generates it, where does the information go, and who processes it.
- b) Develop detailed data and process models including system inputs and outputs.
- c) Develop the test and evaluation requirements that will be used to determine acceptable system performance.

If the systems analysis and design deliverables are to be developed by external developers under a separate contract, then the time/cost estimates should also be a deliverable in this phase.

Deliverable	Responsibility	M = Mandatory PD = Project Dependent
User Requirements Specification(URS) document	Business Analyst	M
	Business Owner	M
	ICT Project Leader	M

11.3. DESIGN PHASE

During this phase, the system is designed to satisfy the functional requirements identified in the previous phase. Since problems in the design phase can be very expensive to solve in later stages of the software development, a variety of elements are considered in the design to mitigate risk.

The purposes of this phase is to:

- a) Identify potential risks and defining mitigating design features
- b) Perform a security risk assessment

- c) Develop a conversion plan to migrate current data to the new system
- d) Determine the operating environment
- e) Define major subsystems and their inputs and outputs
- f) Allocate processes to resources

In this phase, the logical data architecture and any cross-references for screen/report development or data conversion are developed and detailed system functions are designed. The system design is based on the System Requirements and provides system developers with a detailed system programming "blueprint".

Deliverable	Responsibility	M = Mandatory PD = Project Dependent
New/Enhanced Logical Data Architecture	System Developer Database Administrator	PD
Data Conversion Cross Reference This maps the existing data structure to the new/enhanced data architecture.	System Developer	PD
Data Conversion Strategy Based on the Data Conversion Cross Reference and any relative meetings/JAD sessions, this describes the data conversion requirements and methods of converting existing data into the new/enhanced data architecture.	System Developer Database Administrator Business Owner	PD

11.4. CODING PHASE

Once the Design Phase is completed by the Business Analyst and approved by the Business Owner, the Coding Phase commences. In this phase, the database, manual procedures and system functions (programs) are developed. The system functions are also Unit Tested in this phase since the entire system is not tested in its entirety but rather in modules.

The purposes of this phase is to:

- a) Translate the design of the system into code using C# as a coding language
- b) Ensure that well written and easy to maintain codes are observed
- c) Arrange the control flow of the system to correlate with the approved URS
- d) Minimise system errors during the unit testing as opposed to discovering them when the entire system is tested

Deliverable	Responsibility	M = Mandatory PD = Project Dependent
Database(s) Temporary Data Conversion Database/Tables	System Developer Database Administrator	PD
System Functions (Programming Objects)	System Developer	PD
Integration System Testing (new / enhancement)	System Developer	PD

11.5. TESTING PHASE

In this phase, the system functionality is tested according to a User Acceptance Testing (UAT) test based on the System Requirements. Designated Program Area representatives or Business Owners and possibly the Business Analyst would perform the test. Any errors or deficiencies would be identified. The system developers would make the necessary changes to correct the identified deficiencies. After the changes are made, the system would be re-tested until no deficiencies are detected. If the test should identify a change, this may be recorded as a new change request for the next system release.

The purposes of this phase is to:

- a) Defect any design errors before the system or system modification is deployed
- b) Test the system against the system requirement defined in the approved URS
- c) Get final approval from the Business Owner before the system or modification is deployed

Deliverable	Responsibility	M = Mandatory PD = Project Dependent
Test Report	Program Area representatives or Business Owners Business Analyst	PD

11.6. IMPLEMENTATION (DELIVERY) PHASE

This phase is initiated after the system has been tested and approved by the Business Owner. The system is deployed to the production environment to support the intended business functions. System performance is compared to performance objectives established during the planning phase. Implementation includes user notification, user training, installation of hardware, installation of software onto production computers, and integration of the system into daily work processes. This phase continues until the system is operating in production in accordance with the defined user requirements.

Before the implementation of the system, the code is deployed into the testing environment where it is tested before deployment to the live environment takes place. The following steps are implemented for deployment in the testing and live environment:

- a) All changed source code during testing will be compiled to ensure there are no errors.
- b) On the server where the deployment occurs, a backup folder will be created with date.
- c) The deployed code will then be copied into the backup folder
- d) The new changed code will then be copied into the current folder
- e) The database is backed up with the date
- f) All required database scripts are run on the database
- g) If a rollback is required, due to deployed changes not yielding the required results, the database is restored and the backup folder is copied back into the current folder.

11.7. MAINTENANCE

Once the system is successfully deployed users start utilizing the system. The main focus of this phase is to ensure that the needs of the users continue to be met and that the system continues to perform according to the organization's needs as per the specification mentioned in the first phase.

Due to the continuous use of the system by other users, three activities might creep in to trigger the start of the SDLC.

- a) **Bug fixing:** This could be due to bugs reported by the system users which were not identified at all testing phases
- b) **Upgrade:** Upgrading the system to a newer version of the system
- c) **Enhancement:** Adding new features into the existing system

Deliverable	Responsibility	M = Mandatory PD = Project Dependent
Change Request	User Tester Business Analyst	PD

13. RESOURCE IMPLICATIONS

The Management Information Systems (MIS) Development Team consists of five staff members as per the departmental organogram. There is one Deputy Director, Assistant Director, Database Developer, Data Technologist and a Technical Support Officer. These five resources are required to perform all the roles within the system development life cycle in order to develop systems and maintain system development changes. This include required governance, system analysis, and database management; project Management, testing, training and user support for all the projects within the department.

With the roles required for system development, there is a gap in the department to perform specific roles. This leads to a staff member being required to perform multiple roles to in order to complete a project. For the SDLC process to be effectively executed a member cannot perform two consecutive task in the process, e.g. one cannot develop and test the system, this might compromise the quality of the solution.

14. FINANCIAL IMPLICATIONS

The Accounting Officer shall be responsible for budgeting for the implementation, monitoring and evaluation of the policy.

15. IMPLEMENTATION, MONITORING AND EVALUATION

- 15.1. This policy will become effective from the date of signing by the Accounting Officer and shall be applicable to all Government Information Technology Office (GITO) unit.
- 15.2. The policy will be disseminated to all ICT Staff. Dissemination will take place using the email communique.
- 15.3. The policy will also be uploaded on the Departmental Intranet.
- 15.4. The policy will be evaluated through Internal and External Audit processes to ensure objectivity/independence.
- 15.5. Monitoring will be done through implementation of the operational plan by tracking the applicable indicator as specified on the operational plan.

16. POLICY REVIEW

This policy shall be reviewed in 5 years from its effective date to determine its effectiveness and appropriateness. This policy may be reviewed before that time as the need arises in order to reflect substantial departmental changes or any change which may be required.

17. APPROVALS & RECOMMENDATIONS

~~APPROVED/NOT APPROVED:~~

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MR. B DAYIMANI
ACTING HEAD OF DEPARTMENT
DATE: 24/04/2024