

Eric NDAYISHIMIYE

MANIFESTS:

MANAGEMENT INFORMATION
SYSTEMS FOR SOCIAL PROTECTION
PROGRAMMES IN RWANDA



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SYSTEMS FOR SOCIAL PROTECTION
PROGRAMMES IN RWANDA**



KIGALI

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Table 3.4: Essential Security Control Measures

Control	Description
Access Control	Access controls on social protection MISs, including controls to authenticate and permit access only to authorised individuals and controls to prevent users from providing beneficiary information to unauthorised individuals who may seek to obtain this information by fraudulent means.
Physical Security	Access restrictions at physical locations containing beneficiary information, such as buildings, computer facilities, and records storage facilities to permit access only to authorised
Encryption	Encryption of electronic beneficiary information, including while it is in transit or in storage on networks or systems to which unauthorised individuals may have
Procedures	Procedures designed to ensure that any modifications of the beneficiary information system are consistent with the social protection programme's information security programme.
Segregation of Roles	Dual control procedures, segregation of duties and personnel background checks for staff with responsibilities for or access to customer information.
Intrusion Detection Systems	Monitoring systems and procedures to detect actual and attempted attacks on or intrusions into social protection
Backup and Continuity Plans	Measures to protect against destruction, loss, or damage of beneficiary information due to potential environmental hazards, such as fire and water damage or technological failure.

KEY POINTS

1. Social protection MISs should conform to the basic set of information security standards set out in Table 3.4.

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According to ISO 27001, ISMS is a systematic approach to managing confidential or sensitive information so that it remains secure, which means that it is available and confidential and its integrity is intact. ISMS encompasses people, processes, and IT systems, and it involves a process in which the risks to information assets are identified, quantified, addressed, and mitigated, and the effectiveness of this process is then measured.

Based on ISMS, a social protection programme security plan should be designed to:

- Ensure the security and confidentiality of programme software, hardware, and information
- Protect against any anticipated threats or hazards to the security or integrity of the programme information
- Protect against any unauthorised access to or use of such information that could result in substantial harm or inconvenience to any beneficiary
- Ensure the proper disposal of the information of the beneficiaries of the social protection programme.

To achieve these objectives, each social protection programme should implement a security programme that is appropriate to its information security requirements, beginning with assessing and documenting any reasonably foreseeable risks. For example, if the social protection MIS is connected to the Internet, then all the threats posed by that connectivity should be addressed. This risk assessment must also evaluate the potential damage that could arise from any perceived threats. After this risk assessment has been done, security controls are then designed to mitigate the specific security threats that were identified. Table 3.4 provides a list of standard security controls.

social protection programme in question, the following mechanisms should be put in place:

- a) **Capacity Building:** Training should be given to all MIS personnel and users on data entry, data consolidation, data analysing, and data reporting. The manuals for data entry, the segregation of duties control matrixes, and operation guides are necessary tools to ensure that all procedures and program policies are followed.
- b) **Data Entry Checks:** The MIS application must include all standard data checks such as format masks, drop-down menus, data value parameters, warnings of repeating names, and cross-reference checks.
- c) **Duplication Identification:** The key risk involved in any social protection programme is that beneficiaries will be registered multiple times either deliberately or accidentally. The MIS should be designed to prevent this from occurring.
- d) **Segregation of Duties:** A key audit tool in any MIS is the segregation of functions control matrix. The tool lays out the roles and privileges of each user of the MIS system to prevent violations of security and any misuse of the MIS application.
- e) **Exceptional Reports:** The MIS should yield reports to be used to monitor the social protection programme. These reports should be designed in consultation with the monitoring team to ensure that all of the key operational areas of a social protection programme are covered. The timing, scope, and level of detail of these reports should be specified at the point of development of the MIS by system developers.

3.6 Security

Information security is a broad discipline that has two aspects: a logical aspect and a physical aspect. Logical security controls include firewalls and access controls, whereas examples of physical security measures are doors, gates, and badges. Both kinds of measures exist to protect the information gathered in an MIS, so it follows that there should be a set of standards on information security for social protection programmes. These standards should be based on international best practices such as ISO 27001 on information security management system (ISMS) from the International Organization for Standardization.

FOREWORD

Rwanda recognizes the importance of social protection in enhancing the capacity of poor and vulnerable persons in managing economic and social risks. Priority groups for support are set out by the Constitution and include the elderly, disabled, genocide survivors, vulnerable children and other vulnerable groups such as the historically marginalised and single parents.

The number of core social protection programmes, especially cash transfer programmes, has expanded in recent years and now includes the Vision 2020 Umurenge Programme (VUP), Genocide Survivors Support and Assistance Fund (FARG) and Rwanda Demobilisation and Reintegration Commission (RDRC): the VUP Direct Support and Public Works programmes, the FARG emergency assistance and the subsistence allowances for disabled ex-combatants. These will enable the government to take the first steps in establishing a comprehensive Social Protection Floor. A broad definition of social protection would bring together other social protection programmes such as free Twelve Years Basic Education (12YBE), the mutuelle de santé community health insurance, Home Grown School Feeding under the Ministry of Education, Agriculture input subsidies under the Ministry of Agriculture, Minimum Wage setting under the Ministry of Labour among others.

However, one of the main challenges hampering achievement of the desired impact of these programmes on the beneficiaries has been lack of coordination between the implementing institutions and local administrative entities. To mitigate this, a National Social Protection Strategy was approved by Cabinet in 2011 and an updated version was released in July 2013 to align its timeframe with that of the EDPRS2 and to take into account the findings on poverty and on social protection coverage from the results of the EICV3 survey. The Strategy provides a framework for defined institutional arrangements and other reforms in the sector that will enhance coordination, harmonization and consolidation of activities among the line ministries and other key Non State Actors engaged in social protection.

The National Social Protection Strategy seeks to provide a clear institutional framework and coordination mechanism for the Sector. Law N°62/2013 Of 27/08/2013 establishing the Local Administrative Entities Development Agency (LODA). The vision of LODA is to efficiently and effectively contribute to sustainable development and poverty reduction through mobilization of more funds to finance development efforts of decentralized entities. The Agency seeks to develop harmonised delivery systems including a single registry, targeting methods, monitoring and reporting frameworks and payment systems, amongst others.

Management Information Systems (MIS) will play a vital role in the entire continuum of social protection from the point when beneficiaries are registered to the point when they exit the programme. This manifesto envisions a set of two MIS objectives: (1) development of robust MISs for various social protection programmes and (2) development of a single registry as an important foundation to harmonising the social protection sector with the objective of making it effective and efficient.

ABBREVIATIONS

EDPRS2	Economic Development and Poverty Reduction Strategy II 2013-2018
ICT	Information and Communication Technology
ICTs	Information and Communication Technologies
ID	National Identification Card
IPRS	Integrated Population Registration Services
ISMS	Information Security Management System
FARG	Fund for Neediest Survivors of Genocide in Rwanda
FMIS	Fund for Neediest Survivors of Genocide in Rwanda Management Information System
MIS	Management Information System
MEIS	Monitoring and Evaluation System
PDAs	Personal Digital Assistants
SMART	Personal Digital Assistants
SP	Social Protection
SQL	Structured Query Language
VPNs	Virtual Private Networks
VUP-FS	Vision 2020 Umurenge Programme Financial Support
TOR	Terms of Reference

Software application should conform to a set of software design standards. Table 3.2 summarises these standards.

Table 3.2: Key Software Application Standards

User Interface	Access Control	Audit Trail
<ul style="list-style-type: none"> Graphical display, drop down menu, shade and colour code User identification and access procedure Navigation logic throughout the application Security constraints Performance constraint in term of answer time on the VPN Efficiency of the interface framework in terms of bandwidth usage 	<ul style="list-style-type: none"> Identification, authorisation, and access control for data and functionalities of the system Documentation of a security guideline that sets out the roles and access levels 	<ul style="list-style-type: none"> Record of all activities in the application server, including information, warning, and errors Audit trail of all actions executed within the system that identifies the user, the computer, the data, and the time and action

KEY POINTS

1. Except for limited standard components of the MIS such as the databases (SQL Server or Oracle), the rights of ownership and customisation of the application software for the MISs for any social protection programme MIS should rest either with the programme itself or with the institution that is funding it.
2. The design of the application interface should conform to the basic minimum standard set out in Table 3.2.

3.5 Information Management

A well-designed MIS processes data to obtain information, and this information is useful for social protection programmes if it is:

- a) **Complete:** The database should capture the actual information as opposed to blank fields.
- b) **Accurate:** The information collected should be correct and reliable.
- c) **Non-ambiguous:** The data should not contain any duplicate beneficiaries and should be protected against any known frauds.
- d) **Standardised:** The contents and formats such as names and identification numbers should conform to those contained in MIS's data dictionary. The length of fields and content structure should be standardised for aggregation and reporting.
- e) **Relevant:** The information collected should be relevant to the programme's needs and purpose.

To reduce the number of information processing errors and to ensure that the information being collected is useful to the operations of the

3.3 Telecommunication Networks

Rwanda's telecommunication infrastructure has undergone a revolution in the last few years with the laying of fibre-optic international submarine cables. This has been compounded by the expansion of mobile telecommunication infrastructure across the country. For example, fibre cables have been laid to connect all districts. Additionally, mobile providers such as MTN, and Airtel-Tigo have recently upgraded their voice and data connection standards to the fourth generation (popularly referred to as 4G networks).

The growth of the telecommunication sector presents the developers and implementers of social protection MISs in Rwanda with a range of telecommunication products that can be tailor-made to the needs of programmes. For instance, most of the leading telecommunication providers offer virtual private networks at competitive rates. Therefore, a social protection programme that is running a centralised web-based MIS could easily decentralise and extend access to the system to users across the country by use of VPNs (virtual private networks). Alternatively, some programme managers might consider using software that links with other software such as Citrix.

KEY POINTS

1. Rwanda's telecommunication infrastructure has undergone a revolution in the recent years with the laying of international fibre-optic cables.
2. The challenges of connectivity in remote areas can now be addressed using a number of telecommunication solutions such as VPNs or Citrix.

3.4 Application Software

Application software consists of two elements: (i) interface, which is a set of windows within which the user interacts with the application software and (ii) databases. Databases are categorised as either open-sourced or proprietary. Examples of proprietary databases include Oracle, DB 2, and Microsoft SQL Server. An example of an open-sourced database is MYSQL.

Which database to use for social protection programmes should be carefully considered? Factors to consider include how much scalability, flexibility and performance will be needed and what skill sets will be required to support the software. Small pilot programmes — those that target fewer than 5,000 beneficiaries — could easily work with small databases such as Microsoft Access. However, social protection programmes on a national scale require large databases such as SQL Server or Oracle.

EXECUTIVE SUMMARY

This manifesto is designed to achieve the following objectives:

- Help those programmes that do not have management information systems (MISs) to develop them based on minimum standards for effective and efficient functioning
 - Ensure new MISs are based on specifications that allow them to communicate with each other, with existing MISs, and with a central reporting system
 - Ensure that modifications and upgrades of existing MISs enable them to communicate with each other and with a central reporting system.
- a) The principles guiding the development of MISs for social protection should be based on the following principles:
- **Open-sourced ownership arrangement:** Except for any proprietary databases that might be used, the design schemas, operational and technical documentation, and source code will all be copyrighted to the Government of Rwanda.
 - **Communication capacity (other MIS/central reporting system):** A standard will be established where each social protection MIS will store a set of essential information that can be communicated to a central reporting system or to a Single Registry for sector-wide reporting and monitoring.
- b) Policy-related guidelines: When developing MIS, clear decisions should be made at the outset regarding:
- **Information needs.** Social protection programmes should collect and store on their MISs the essential information.
 - **Legislation and other regulatory requirements.** The Rwandan constitution and international data transfer and information privacy protocols should be adhered to in the collection, transfer, and storage of the information.
 - **Capacity to link with broader social sector MISs.** Each social protection MIS should be compatible with and capable of being linked to other MISs in the sector to ensure that there is a coherent and integrated database supporting all social protection programmes, especially social assistance programmes.
- c) The recommended minimum information needs for MISs are provided in this manifesto and include:
- Centralised hosting and distributed access
 - Durable hardware
 - Reliable connectivity
 - Adequate information security measures
 - Rapid application development.

1. INTRODUCTION

There is growing recognition that social protection MISs consist of more than just hardware and software. In fact, they play an important role in social protection policy as well as in programme administration. However, to a large degree, most stakeholders have yet to fully comprehend the important policy role played by the social protection MIS.

Therefore, this manifesto sets out the important factors that should be considered when designing the MISs for social protection programmes.

The manifesto is structured as follows:

Chapter 2 discusses policy-related factors such as what information should be collected and kept by the MISs, what type of reports should be made not only for programme administration but also for policy formulation, who should “own” the databases and other MIS resources, what technology should be used, and various legal and institutional considerations.

Chapter 3 addresses technical considerations. Broadly, these factors include the architecture of the MIS, its connectivity elements, the language of the source code, database schemas, data transfer protocols, hardware, application software, security, and backups. These technical elements are usually left to the discretion of the software and hardware suppliers, but they are very fundamental and should be included in the procurement documentation for the hardware and software resources for social protection MISs.

Table 3.1: An Analysis of Hardware Options

Model	Technology	Implementation	Feasibility
PDA-based Decentralised Model	The beneficiary list is captured on a PDA (Personal Digital Assistant) on a real-time or near real-time basis. The PDA is a portable computer that can be fitted with a rugged casing to protect it from harsh environmental conditions. Some PDA models also have smart card capability while others scanners and cameras. PDAs can be loaded with an operating system such as Windows Mobile and can host applications such as standard MIS solutions. The PDA's battery can last for 48 hours with continuous use.	<ul style="list-style-type: none"> - The model requires a central database server and PDAs available at the community level. - The PDAs are then configured to send data to the national servers using GSM/GPRS/ EDGE/3G mobile phone connectivity. 	<ul style="list-style-type: none"> - The PDA is portable and allows registration to be done in real time. It merges several technologies, thus reducing the costs of procuring separate gadgets such as laptops and cameras. It comes with GSM functionality, thus making it possible to send data from remote areas. - The disadvantage is that there are fewer developers who provide solutions tailored to this platform. There is also the risk of data loss, but GPRS/EDGE data transfer can reduce this risk.
Laptop-based Decentralised Model	The beneficiaries are registered on a laptop on real time or near real time. Laptops are portable and relatively lightweight computers. They can be loaded with standard operating systems and applications software. Laptops have a rechargeable battery that can last for three hours with continuous use.	The laptops loaded with the MIS system are distributed to the community level. The information collected and entered locally is then sent to the national servers via synchronisation or connectivity options.	The laptop is portable but a PDA is a lot lighter. Mobile registration is therefore possible. There are many developers that provide solutions that run on this platform. The risk associated with this model is that data will be lost through the theft or breakdown of the equipment.
Desktop-based Decentralised Model	The beneficiaries are registered on paper forms. The information is then entered into the nearest desktop computer.	The desktops are installed with the MIS system at the district or any other administrative level. Data are collected from the beneficiaries using designed paper forms and are then entered into the nearest computer. If collected at the local level, the data are then forwarded to the district for consolidation and subsequently to the national level for	The use of paper reduces the chances of data being lost because there is a paper trail for the registered households. However, there is considerable duplication of effort in entering the information both onto paper and then into the computer.

KEY POINTS

1. The choice of hardware should be determined by the requirements of the social protection programme and its software needs
2. The hardware should have adequate memory, disc space, and processing capacity. If handheld devices are deemed to be appropriate, then they should be tested for their ruggedness for use in the field.

3.1 Architecture and Information Transfer

The architecture for social protection MISs can be defined in two main ways: (1) the number and distribution of the databases and (2) the mechanisms by which the databases are updated with information. For instance, a completely centralised information system handles all processing at a single computer site, maintains a single central database and develops all applications, provides technical services, sets priorities, and allocates computer resources all from the centre.

The main advantage of a centralised information system is standardisation in collection of data and the management of information. Economies of scale can also be achieved when it is not necessary to use of multiple hardware, software, spaces, personnel, and databases. It may also be possible to recruit more qualified personnel in a central facility. However, this approach depends on the ability of personnel in districts to connect with the central system, and this can be a problem in areas with little telecommunications infrastructure. However, this challenge could easily be overcome by deploying software that facilitates connectivity even in environments with low or erratic bandwidths such as Citrix Software.

Conversely, when the information system is decentralised, there are many different databases and functions at the country and district level. The level and depth of decentralisation will depend on the needs and operation of the social protection programmes. One advantage of this approach is that users are able to capture the data on a real-time basis, and it can be used in areas with limited or no telecommunication infrastructure.

3.2 Hardware Infrastructure

The choice of hardware resources (such as desktop computers, handheld devices, and laptops) should be guided by the application software requirements of the MIS. If a social protection programme needs to be able to register beneficiaries in rural environments using handheld devices/Personal Digital Assistants (PDAs), then these devices should preferably be sturdy. It is equally important to procure servers that can be scaled up to accommodate the potential growth of the programmes. Table 3.1 presents a comparative assessment of laptops, desktops, and PDAs as they are used to registering beneficiaries in a decentralised data collection system.

2. POLICY CONSIDERATIONS

Management information systems (MISs) play a vital role in the entire continuum of social protection from the point when beneficiaries are registered to the point when they exit the programme. Several of the processes within this continuum lend themselves to computerisation and even, in some advanced cases, to automation. Therefore, it is important to make some decisions about which processes can best be served by technology before going on to make decisions about the technology itself.

The key policy elements that should be considered when establishing a social protection MIS include:

- What information is needed to inform policy
- What reporting indicators can best provide this information
- What capacity and support exists
- Issues of intellectual property
- What project management and development approach to take
- The prevailing legal and regulatory framework.

2.1 Information Requirements

One of the factors that is often overlooked when designing a social protection MIS is the importance of clearly defining the information needs of the programme. It is often assumed that software application vendors will help to define the programme's information requirements during the procurement process.

In fact, the volume and kinds of information needed have a direct effect on programme administration, running costs, and the choice of an appropriate technology. For example, if it is decided that detailed data are needed (for example, on households' marital status, educational attainment, water sources, sanitation, landholding size, assets, occupational status, disability status, health status, or distance from schools or health centres), — then this will require sophisticated data collection and storage technologies, which will push up the costs of administering the social protection programme.

Table 2.1 sets out the essential information that should be recorded in a social protection MIS. Other information may be required for monitoring, but this is likely to change frequently.

Table 2.1: Essential Information Needed for a Well-functioning Social Protection Management in a formation System

Applicant/ Recipient	Application Process	Grievance Process	Payment Process	Exit Process	Programme Details
Name	Date applied	Date of submission of grievance	Transfer amount	Date of re-certification	Programme name
Date of birth/age	Status of application	Reason for complaint	Frequency of payment	Date due to exit programme	Partners
Sex	Date decision made	Stage in process (and date)	Expected dates of payment	Date exited programme	Start Date
Address (with community/ district, village etc)	Result of decision (yes/no)	Date of resolution	Dates of actual payment	Reason for exiting programme	End Date
ID number	Date registered	Decision on initial appeal	Amount paid		Size of Transfer
Photo (optional)	Reason for rejection	Date applicant informed	Reasons for difference between scheduled and paid amounts		- Coverage - Implementing agency - Number of beneficiaries
Biometrics (optional)		- Confirmation of action taken - Date of submission of further appeal - Stage in process - Date of resolution - Decision on further appeal - Date when applicant was informed of decision - Confirmation of action taken and date - Implementing agency	- Name of proxy recipient - Date of birth/age of proxy - Sex of proxy - ID number of proxy to recipient		

KEY POINTS

1. Define and document key information needs prior to the design of a Social Protection MIS.
2. Conform to the basic minimum information for a well-functioning Social Protection MIS as set out in Table 2.1

Accordingly, the information management process for social protection programmes should conform to the same set of principles as set out on Table 2.4.

Table 2.4: Key Data protection and Information Privacy Principles

Principle	Provisions
Notice	People should be given notice when their data are being collected.
Purpose and disclosure	Personal information should only be used for the purpose for which it has been proposed.
Consent	The information should not be disclosed without the knowledge and consent of the person to whom it relates.
Security	The information should be kept secure from any potential abuse.
Access	Subjects should be allowed to access their personal information and to correct any inaccuracies.
Accountability	Those who collect and manage the information are in an ethical-legal relationship with the subjects of that information, to whom they should be transparent and accountable.

KEY POINTS

1. Social protection MISs should conform to Article 23 Rwanda's Constitution of 2003 with Amendments through 2015 and to other international principles governing data protection and information privacy.
2. These principles are included in the Council of Europe's Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, the United Nations Guidelines Concerning Computerized Personal Data Files, and the OECD Guidelines on the Protection of Privacy and Trans-border Flows of Personal Data.

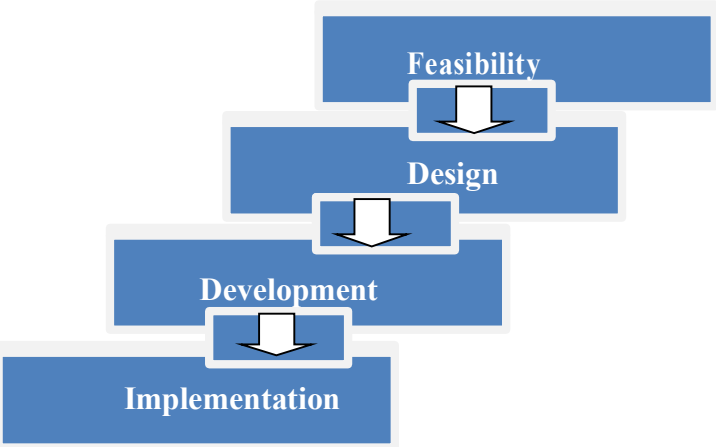
3. TECHNICAL FACTORS

The technical aspects of social protection MISs consist of hardware, application software, and databases. Factors that should be considered in the design and application of these elements include:

- Architecture and transfer of information
- Information management
- Hardware infrastructure
- Telecommunication networks
- Backup and security
- Application software design parameters.

In either case, it is essential to plan the stages of the process — analysis, design, development and implementation — carefully in advance. Some approaches to developing software are faster than others and thus deliver the MIS solution more rapidly.

Figure 2.1: A Waterfall Model of a Software Development Lifecycle



KEY POINTS

- 1. Establish a team of people to provide technical oversight over the design and implementation of the social protection MIS system.
- 2. Customise existing application software (when software is not limited by proprietary regulations) to develop MIS application rapidly.
- 3. Whereas traditional waterfall model is still relevant, it preferable to use iterative prototyping.

2.6 Legal and Regulatory Framework

The discourses on personal data protection in Rwanda has long been the subject of banking law, particularly as it relates to the protection of personal financial information. However, the subject has recently become more prominent in the context of the increased use of information and communications technologies (ICTs), the universal nature of modern day communications and the emergence of the globalized information society.

Article 23 Rwanda's Constitution of 2003 with Amendments through 2015 protects individual privacy, including people's right not to have information relating to their family or private affairs unnecessarily revealed or the privacy of their communications infringed. It is expected that specific legislation will soon be enacted to set standards for privacy and data protection laws.

2.2 Reporting Indicators

Having information on the implementation and performance of social protection programmes enables policymakers and managers to know how effectively the programme is operating. In case more complex reporting is required, then specific data mining software such as Crystal Reports may be procured. However, SPSS software is only likely to be required for particularly complex statistical analysis.

Table 2.2 presents the essential reporting indicators that should be included in a social protection MIS.

Table 2.2: Essential Reporting Indicators Needed for a Well-functioning Social Protection Management Information System

Programme Process	Report	Use of the Report
Registration	<ul style="list-style-type: none">• Number and list of registered applicants/ beneficiaries• Registration profile in terms of household structure, demographics, disability, orphan-	<ul style="list-style-type: none">• Determine the accuracy of the registration process• Determine the percentage of records with incomplete or missing data
Targeting	<ul style="list-style-type: none">• Number of those who were actually targeted versus number that was planned• Number of applicants rejected• Beneficiaries graduating from the	<ul style="list-style-type: none">• Determine the accuracy of targeting mechanisms• Determine the number of beneficiaries graduating from the programme and reasons
Enrolment	<ul style="list-style-type: none">• Number of potential beneficiaries that did not enrol and reasons why not• Beneficiaries removed as a result of appeals or any other reason approved by the programme• Number of beneficiaries who nominate proxies to act as recipients• Recipient profiles in terms of age, sex and	<ul style="list-style-type: none">• Determine the transition rates of beneficiaries from targeting to payments• Effectiveness of the targeting mechanisms based on the number of appeal cases• Profile of the recipients
Payments	<ul style="list-style-type: none">• Number of beneficiaries to be paid after enrolment• Number of beneficiaries aggregated by payment cycle• Successful payments in terms of volume and value• Failed payments in terms of volume and value• Back payments in terms of volume and value	<ul style="list-style-type: none">• Efficiency of the payment process
Change Management	<ul style="list-style-type: none">• List of changes in beneficiary details aggregated by type of change• Number and list of data correction errors	<ul style="list-style-type: none">• Frequency and nature of changes to beneficiary details
Complaints	<ul style="list-style-type: none">• List of complaints by type and resolution• Number of complaints by type, time, location, age, and sex	<ul style="list-style-type: none">• Complaints about programme performance

KEY POINTS

- 1. Define and document key programme indicators.
- 2. Conform to “basic minimum reporting parameters” as set out on Table 2.2 above.

2.3 Capacity and Support

Policymakers should also work out at the outset how much capacity is needed to support a social protection MIS. Irrespective of who implements and owns the system, support is important for the successful implementation of an MIS system. By and large, social protection MISs in Rwanda — such as the UBUDEHE MIS, VUP-FS Information System, MEIS, and FMIS_Database — are staffed by personnel with an ICT background. However, a fundamentally important issue is the need to recruit and retain personnel with competence and experience in administering networks, operating systems, and databases.

Identifying personnel who can administer a social protection MIS and formalising their roles and responsibilities is a precondition for structured and timely information management. It is also important to explicitly segregate the duties of MIS administrators.

A sample segregation of roles is provided in Table 2.3 below.

As a matter of fact, less support would be required if policymakers were to define the skill sets needed at the MIS development stage based on Kenya's ICT market training preferences. For example, it would be helpful to define a specific MIS development framework (for example, the ASP.NET technology platform) because a large pool of such developers is available in the labour market. In terms of databases, those with the highest number of skilled administrators are Microsoft's SQL Server and Oracle.

Table 2.3: Sample Segregation of Roles in a Social Protection MIS

Module	Function	Administrator	Supervisor	Verifier	Data Entry
Registration	Add applicants				✓
	Modify applicant details	✓		✓	
	Delete application	✓	✓	✓	✓
	View details				✓
Targeting	Add details			✓	
	Modify details	✓			
	Delete details	✓	✓	✓	✓
	View details				

KEY POINTS

1. Identify competent personnel — in administering networks, operating systems, and databases — to work with the social protection MIS and explicitly define their roles and responsibilities.
2. Define and document guidelines that clearly define the roles and duties of each user of the social protection MIS.

2.4 Intellectual Property

On average, the useful life of computer hardware is five years. Conversely, software technology evolves rapidly. Yet, the two — software and hardware — are both important MIS components. When policymakers are deciding what type of application software and source codes (either proprietary or open-sourced) to use, they need to take into account any potential technological changes in software. For example, if they decide to procure proprietary software, then they may wish to enter into an escrow agreement with the software developer in which an independent trusted third party — e.g. banks or law firms — would receive and store MIS source code in case the supplier goes out of business. This would ensure the continuation of support and customisation of software by another entity should the developer become insolvent.

KEY POINTS

1. Except for standard proprietary databases (such as Oracle and SQL Server) — the ownership of the documentation, reports, specifications, and custom-built software should be licensed to the Government of Rwanda.
2. It is reasonable to put in place escrow agreements to take care of social protection application software in case the software supplier companies cease to exist for whatever reason.

2.5 Project Administration and Software Development Approach

During the development of an MIS, it is prudent to establish a team of people who lead and oversee its design and implementation. These people should preferably constitute two teams: a steering team and a technical team. The steering team would ensure that the overall goal of the MIS project is achieved and would be responsible for solving any broad issues or challenges. On the other hand, the technical team would monitor the tasks and deliverables of the project. Policymakers must also decide from the outset how the MIS software should be developed.

Within the current context, there are three viable options: (1) customising an existing MIS; (2) developing a new application; or (3) procuring off-the-shelf software. Because there is no standard off-the-shelf MIS package for social protection, many existing social protection programmes (including UBUDEHE MIS, MEIS, VUP-FS Information System, and FMIS_Database) use either newly developed applications or customisations from other software.