1 Project M&E and MIS

The M&E (Monitoring and Evaluation) system is not just a mechanism to collect data but a management tool to assess progress towards results, identification of constraints and to take remedial actions. A Management Information System (MIS) if well integrated with M&E helps improve the management of data through easy retrieval, analysis, reporting, planning etc. as well as improves transparency and flexibility across project operations. In most projects, the M&E system should precede the development of the MIS since, information needs, processes as well as expected Result Indicators get clearer as project is operationalized. Overall, the key outputs of a well-coordinated and integrated M&E and MIS system include:

- Regular Data Collection through participation of communities- farmer (s), collectives etc., institutional mechanisms- service providers, project staff as well through external evaluation agencies/3rd parties.
- Improved Data Management and storage for ease of retrieval/access, data validation, security etc.
- Tracking of performance and progress of project- component(s), result indicators (derived from the Log frames of projects), project partners (groups, NGO's, Facilitators etc.), fund utilisation, project planning (Ex: Annual Work Plan and Budgets) etc.
- Disaggregation and aggregation of data by components, geography, mainstreaming focus Eg: Gender, Age etc.
- Reporting and Analytics to support decision making and remedial actions.
- Detailed financial appraisal of the project's inputs and outputs
- Reporting on expected and realised impact of the project.

2 Setup of the M&E and MIS system- IFAD Projects

2.1 Project Lifecycle

Based on IFAD's guide for design of M&E systems² (modified to meet the new developments), following are the key requirement for M&E at each stage of the project.

2.1.1 Design Stage

2.1.1.1 Design Report

- Define the scope and purpose of the M&E system answering why do we need a M&E system and how comprehensive it should be
- Define Key result indicators, means of verification, information needs, monitoring mechanisms as part of the design narrative and Log frame Matrix answering what do we need to monitor and evaluate in order to manage it well

¹ The document has been prepared by Ms. Esha Singh, Country Technical Analyst, PMI and Mr. Frew Behabtu, Programme Officer, APR

² IFAD's Independent Office of Evaluation, 2002, " A guide for project M&E", <u>https://www.ifad.org/documents/38714182/39723123/toc.pdf/e7c718e2-56b9-4f60-b404-3f31448a38a2</u>

- Define organisational arrangements for M&E answering how will the required information be gathered and managed
- Define the process of how M&E will be established during start-up
- Establish an indicative M&E budget
- Document the detailed M&E framework
- Define Terms of Reference for M&E staff

2.1.2 Pre- Start-up

- Revise the performance questions and indicators, monitoring mechanisms based on project strategy as well as consultations with key partners
- Organise training and sensitisation for M&E staff
- Initiate baseline assessment for effective monitoring of the project progress. (based on loan approval and initial disbursement)
- Prepare a project implementation manual and develop a detailed M&E plan taking into consideration existing mechanisms with project partners answering what will the collected information be used for as well reporting lines and process

2.1.3 Start Up Phase

- Review the design of M&E plan in relation to key stakeholders
- Put in place necessary conditions and capacities for M&E to be implemented
- Elaborate the Log frame/M&E Matrix and put in place the Annual Work Plan and Budget (AWPB) and Procurement Plan (PP) for the first 18 months for effective monitoring of progress.

2.1.4 Project Implementation Stage

- Ensure information needs for management are met as per agreed result indicators
- Coordinate information gathering , management and validation of information
- Facilitate informal information gathering and communication through the monitoring mechanisms
- Support regular review meetings
- **Develop the MIS system** through consultative feedback and information, reporting, management and analysis needs of the project (details on MIS architecture is in the next section)
- Prepare for supervision missions, annual review meetings etc.
- Prepare annual progress reports and communicate with all stakeholders.
- Continuous knowledge management- case studies, lessons learnt etc. are part of the overall

2.1.5 Project Mid-Term/Completion

- Collate information for mid-term review
- Facilitate the internal review process and course correct the M&E and MIS systems and processes based on recommendations.
- Access what implementers can do to sustain impacts and M&E, MIS after project closure
- Identify lesson learnt for next phase/new projects

3 MIS System Architecture

The MIS should preferably have the following 3-tiered architecture: data layer including storage, and database management; the business logic which has data processing and

analytical capabilities; and lastly the interface which has the web based dashboard. Ideally, data should not be stored on cloud or private servers and all efforts should be made to store on-premises of government's data centres. These 3 layers also complement the **key elements of M&E systems** i.e. designing and setting up information, gathering and managing information, reflecting critically to improve action and communicating and reporting results. Having a 3 tiered architecture also gives greater flexibility to development teams by allowing them to update a specific part of an application independently of the other parts. The MIS system integrates M&E information along with other data to help undertake analysis, improve transparency and communication.



Figure 1: Proposed Architecture of an MIS system

- The data layer includes storage, connection and management of structured data from all relevant databases (example- M&E, log frames, financial, marketing etc.) which are extracted, stored and managed for further processing. This layer is usually developed using MySQL, Oracle, PostgreSQL, Microsoft SQL Server, MongoDB, etc. Data is accessed by the data processing and analysis layer via API calls.
- The data processing and analytics layer manages the overall access control, data processing, and analysis of available data. This layer is usually developed on Java, .NET, C#, Python, C++, etc.
- The topmost layer is the Presentation layer which has the web based dashboards based on responsive web design. This layer is developed using HTML5, JavaScript, CSS, or other web development frameworks.

4 Key MIS Functions

Before designing the MIS database, it is also crucial to identify what data to collect, how to collect, validate, verify and store before further processing and analysis. At the design stage of the project, several results indicators are identified. Further, it is useful to identify what data should be collected to improve operations, decision making etc.

The MIS team in collaboration with the M&E and planning team as well as sector specific heads, should create a **data model** to specifically identify what data has to be collected; what data can be derived and calculated to generate specific analysis; reports etc.; data constraints for validation; how will the data be organized in physical tables; database requirements (storage, processing capacity etc.); and define relationships and primary identifiers (primary keys) etc. The mapping will help create a database structure, which is useful to understand the data, data relationships, constraints and semantics. The team can further decide how the data will be collected and input to the system.

For IFAD supported projects, the MIS should support recording of information related to the logframe, AWPB, M&E framework as well as KPI's related to projects targets- physical, socio-economic, financial etc. Additionally, the MIS system should also support workflow management for data validation, analysis of information such as performance ratings, production analysis, historical analysis etc. The MIS system should also support generation of key reports and serve as a repository for knowledge products etc.

4.1 Data Collection and Storage

For M&E, the data collection process should consider who to collect information from, when, how and for what purpose (monitoring, outputs, impact etc.). Several rounds of data collection are done during the course of the project, e.g. one time such as beneficiary profiles, ad-hoc such as baseline, midterm etc., yearly such as annual reviews, monthly such as production, marketing etc. The project can adopt several approaches for each data collection process example: participatory rural appraisals, sample surveys, yearly surveys, annual outcome surveys, focus groups, mobile data collections, manual entries, registry books etc. The M&E team in consultation with the key technical specialists for the project should ensure that all relevant information for KPI's is collected and recorded in the MIS system.

4.1.1 Data Input, Verification and Validation

- For regular/real-time data collection, participation of beneficiaries/community/groups supported by the project is preferred. As an example in Integrated Livelihood Support Programme (ILSP), India the producer group input information related to production, savings, sales etc. in manual registers.
- The beneficiaries could be supported by field resource NGO's, government facilitators etc. through capacity building on data recording, ensuring the quality and validity of data, data recording on client application etc. In ILSP the producer group data inputs are facilitated and verified by community facilitators (1 for a group of 5-6 villages) from the resource NGO's. (Figure 2)
- The data could be collected manually or through mobile applications based on feasibility (eg: mobile network availability, existing capacities etc.). As an examplegeo data for rural infrastructure can be collected using devices connected to mobile phones. This helps in the verification process of target activities. (Figure 3)³. Besides collecting the geocode, picture/image of the infrastructure at different stage also provides better information for verification.
- The district/cluster and state level MIS and M&E teams should be responsible for the quality of data collected, and its verification.
- Integrating means of verification at data input stage, conducting spot checks and collecting GIS information can help the data verification process. As an example:

³ There are several applications of Geotagging and GIS in IFAD projects specifically in natural resource management, all of which have not been included due to paucity of space.

In ILSP, the system allows the data entry operators to upload a means of verification such as bank passbook etc. to allow for verification by cluster, block and district level officers. (Figure 4)



Figure 2: Data Entry by Producer Groups in Manual Registers and verification process (ILSP)

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Figure 3: Geotagging of Infrastructure for verification

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Figure 3: Means of verification incorporated to ensure quality of data input

The information flow should be through the internet to the main MIS Web server and to the database. The MIS should be capable of receiving input from other databases such as Tally (or others) for financial progress, government databases (if any), marketing database (if value chain components are included) and others depending on project scope. The data layer of the MIS supports basic data-base operations for functional storage, selection, aggregation, processing, integrity, and data audit. The entire solution should be installed and hosted in the infrastructure provided by the government (ideally) or a secure server identified in consultation with the government. Before planning on hosting, database requirements, bandwidth requirements, and server specifications etc. should be accessed.



Figure 4: Proposed Architecture for Data Collection

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Figure 5: Example of Data Management and Retrieval

4.2 Data Analysis and Management

Business logic or data analysis and management layers acts as an interface between the interface/web based dashboard and the Data Layer. It generally refers to validation of data, logical decision, evaluations, calculations, data insertions/modifications etc. The layer also supports workflow activity that is necessary to complete a task. The key functions are as below:

- Support user management based on name, login id, access control, mobile numbers, email id's etc.
- Support user privilege based logins with hierarchical structure as per state organogram.
- Create proper workflows along with add/edit access controls based on user profiles to ensure data accuracy and validity (apart from system validation checks).
- Support Data encryption based on user profile for sensitive information such as bank accounts, aadhaar number(national identifiers) etc.
- Establish quantitative baseline of performance using identified result indicators
- Monitor and track the implementation/execution and performance of key result indicators, service provider/RNGO's etc., value chains etc.
- Establish trends and identify patterns (anomalies, historical trends)
- Design corrective actions and track the effects of those actions
- Provide alerts for actions to be taken
- Establish trends and relationships through data analysis (diagnostic and descriptive) between multiple systems
- Define and monitor result indicators for the entire system
- Support automated notification mechanism through email/SMS.
- Analyse data across different modules and create alerts based on the defined result indicators. Examples: Analysis and comparing targets in log frame with actual completion as shown below.

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Figure 6: Example: Basic analysis on available data- target vs. planned comparison

4.3 Data Presentation

The data presentation layer is the end user interface. For IFAD projects, the MIS interface should have the capability for a web based dashboard describing the progress of key indicators- targeting, physical infrastructure, socio-economic KPI'S, Financial progress etc. The key functions of the presentation layer are:

- Support easy to use user interface which is bilingual, customizable and configurable.
- Present geospatial reporting over the available data.
- Present real-time monitoring/reporting and analysis of available data.
- Provide mechanism to maintain and track assigned reports for stakeholders.
- Schedule reports on periodic basis in backend and perform defined actions such as E-mail/SMS for relevant stakeholders based on the analytics reports
- Capability of preparing and presenting reports.
- Capability to export reports in tabular and graphical formats (PDF, CSV, excel etc.).

As an Example from ILSP, Uttarakhand, India project the main dashboard shows information on physical progress in terms of targeting, financial progress etc.



Figure 7: Sample dashboard

4.3.1 Reporting and Analysis

All users should be shown relevant reports according to their roles and responsibilities, along with automated alerts on the issues faced immediately under their jurisdiction. As the level of view increases in the system, a larger aggregate of information should be available than the previous level to get an overview of operations. However, granularity of data should not be lost at any level and stakeholders should be able to drill down to the desired level of aggregation (per district, per cluster, per group, per hh etc.). Two types of reports should be made available to the stakeholders through the MIS:

- <u>Monitoring reports</u> used for operations management by officials to ensure smooth day-to-day operations. The frequency of these reports should be real-time or daily, depending upon the component being tracked.
- <u>Analytics reports</u> These reports should be obtained by analyzing the data over time to determine long-term trends/relations between data and operations. These can be used by officials to implement improvements in the system by addressing recurring issues and streamlining certain operations. The performance of the system should be tracked over time should automatically determine the areas which need to be addressed, thus allowing the officials to easily identify and bring about improvements in the system.

5 M&E and MIS Management Structure

It would be essential to have M&E as well as separate MIS staff to support the project. While M&E staff should lead the project planning and monitoring process such as preparation of AWPB's, defining key indicators in consultation with other technical staff and the overall monitoring process including regular monitoring, project supervisions, mid-terms etc.; the MIS staff⁴ should support the development, deployment, maintenance and use of MIS system to support data collection and analysis for effective M&E.

The project PMU should have a lead manager for M&E Planning and MIS, supported by an MIS specialist as well as support staff for these critical functions. The sub regional/district/ cluster staff should also be trained in M&E and MIS functions. It would also be advisable to have technical resources (example from NGO's etc.) to support projects in effective data collection and management at the Village/cluster level.



Figure 8: Example of M&E and MIS Management Structure

⁴ Should be a technical resource with prior experience in e-governance project for government and/or private sector organisations.

Annexure 1: Scope of Work for MIS Specialist in IFAD projects

Description: <About the Project>

The role: The MIS specialist will be a technical focal point for all developments and enhancements of IT/MIS systems under the project. The specialist will effectively coordinate all technical and business requirements for the MIS system in close collaboration with other sector specialists under the supervision of the M&E planning and MIS Head. The MIS specialist along with core technical functions will also head regular supervision and implementation activities of the project for a designated block/district. The key deliverables/functions are as below:

- Assess data/information requirements for the project based on requisite result indicators, identify data collection methods, data relationships, physical and logical structure of data in coordination with M&E and planning head and other sector heads.
- Define key processes needed to deliver the planned activities under the project with a view to increase the coverage and efficiency of activities, through the use of IT systems, MIS, and databases to manage and report on the project activities.
- Identify key online, offline and mobile-based tools to interact with project beneficiaries and community resources/partners.
- Based on these assessments, identify the various requirements (covering multiple aspects, including human resource, capacity, financial resources, and technical specifications/functional requirements of the IT/MIS systems required to support project activities.
- Develop/support the development, testing and deployment of IT system/MIS for the project activities.
- Ensure capacity building of identified technical resources to support IT/MIS functions.
- Ensure capacity building of project staff and senior management on use of IT/MIS systems for reporting, reviewing progress, identifying key bottlenecks and decision making.
- Define standard operating procedures for online/offline/mobile data input, verification and validation.
- Define workflows for effective data entry and management and ensure timely and accurate data entry of all MIS related data for the project in close coordination with district/block and community level resources.
- Undertake technical enhancements from time to time to improve functional capacity as well as performance of the system.
- Extend co-operation and support to external/partner agencies in proper implementation of baseline, midterm and end line surveys.
- Take proactive role in design and integration of M&E tools to the web based MIS system to be installed for the project.
- Provide handholding support to field staff on MIS/M&E ensuring timely flow of data in order to generate required progress reports.
- Proactively undertake field visits to undertake sample check of data through consultations with stakeholders.