

Paper 1: Monitoring and Evaluation System

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The Inception Report on Evaluation of Management Transfer Performance and Process, prepared by Research and Technology Development Branch (RTDB) and International Irrigation Management Institute (IIMI) (now International Water Management Institute, IWMI), has identified two basic questions in relation to irrigation management transfer programs in Nepal:

- What are the impacts of turnover and joint management?
- What are the processes that lead to successful turnover or joint management?

The first question is related to appropriateness and outcomes of management transfer interventions in Nepal whereas the second is related to identification of successful intervention approaches that can be adopted to other irrigation systems. Convincing answers to these questions can only be obtained through analyses of a well-recorded longitudinal set of relevant data.

BACKGROUND

In the past, numerous exercises have been done to improve the M&E systems in DOI with the purpose of effective project planning, implementation, and evaluation. Similarly, a large number of M&E surveys have been conducted and reports prepared at different points in time over the last decade. Most of them were initiated and designed by different donors and their consultants and as a result, they have tended to pursue a wide range of approaches and methods. Mainly because of this, many such efforts had little impact on planning or management in the DOI (Shah, 1993). A common criticism has been the lack of attention to the performance aspects of the irrigation systems in achieving its primary objectives concerning water delivery. More generally, these various attempts have not led to the establishment of a single standard M&E system under DOI.

The existing M&E systems still lack sufficient basis which would have allowed to address the above mentioned two basic questions related to process and performance of an irrigation system. Presently, System Management Branch (SMB)/IMD/DOI and Management Information System Unit (MISU)/PDMED/DOI are primarily engaged in monitoring various aspects of irrigation development in Nepal. The Monitoring and Evaluation (M&E) Unit of SMB is mostly involved in collecting the data related to Irrigation Management Transfer Project (IMTP) sites (11 irrigation systems) and different DOI-managed irrigation systems (about 35) under Operation and Maintenance

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(O&M). The MIS Unit is concerned with some other projects too, inclusive of irrigation systems covered by M&E Unit of SMB. With the view to help monitor and evaluate irrigation management transfer effectively, RTDB and IIMI provided assistance to them in integrating the existing monitoring activities into a system that provides clearer information on how well the management transfer interventions are proceeding and on the impacts of the interventions.

The aim has been to assist DOI to augment or establish appropriate monitoring and evaluation systems, including systems for data analysis and dissemination, to make the information generated most useful to implementers and policy makers to allow for better design and implementation of management transfer programs.

In the same line, a review of existing M&E systems – to determine where gaps and problems are – was undertaken by RTDB and IIMI in April 1997. The findings indicated that at present no entity was fully functional to carry out monitoring and evaluation of management transfer process and performance on a regular basis. Basic M&E database and information to be placed into M&E systems are lacking though large amounts of data are available in various reports and files. Such information do not get systematically analyzed and stored for future use.

Invoked by these findings and for taking advantage of the existing data to enrich the institutional M&E systems, efforts for assembling the relevant secondary data were made. Subsequently, the existing M&E database systems were also refined with the help of the concerned technical staffs themselves. The additional data collected in course of the data assembly works, performance measures study, irrigation service fee study, and irrigation management transfer impact assessment study were also loaded on the modified database systems. Most of these exercises were done during the period of March to July 1998.

During all these efforts, it was always kept in mind that M&E systems that demand for larger amount of information tend to fail rapidly especially in the context where practices of relevant data collection, storage, and regular dissemination are not properly institutionalized and consequently, considered less important works. With the same view, that the developed M&E system would be utilized on a sustained basis, care has been taken to start with a minimal set of indicators that can allow for making principal inferences in relation to agriculture, maintenance, and operation performances of different irrigation systems.

The scope of work was limited to the irrigation systems that have some form of management transfer programs in form of a full turnover or a joint management program.

Nevertheless, the tasks do not end here, and there is much to make good use of the established database for monitoring and evaluation purposes, for continued updating of the database, and for addition of more variables and analysis tools for making more

meaningful and useful inferences as felt necessary. In same regard, this report discusses on the following aspects:

- Use of the suggested M&E system
- Related issues and concerns
- Suggestions for its continued implementation
- Recommendations on further improvements
- Follow up requirements

M&E SYSTEM USE

The suggested M&E system has been designed for installation on the computer network of the DOI. Presently, the network has not become fully functional but the DOI is expected to have it done in the near future. By doing so, the database can be accessed by any people in DOI. However, to provide access to the authorized people only, a password will be required that MIS or M&E Unit can make available to the genuine requester.

The designed database, presently, has three sets of information:

- *Agricultural performance*: Yields of main crops, prices, and irrigated areas in different seasons.
- *Maintenance performance*: Government O&M expenditures, farmers' resource generation and expenditures.
- *Operational performance*: Flow rate data at head works.

Above data have been gathered from different sources and put together in a way that can provide important information as mentioned below:

Agricultural Indicators³

- Gross Value of Production per hectare of the command area
- Gross Value of Production per hectare of the Irrigated Area
- Gross value of Production per unit of Irrigation Supplied
- Gross value of Production per unit of Water Consumed by ET_{crop}

Water Related Indicators

- Relative Water Supply
- Relative Irrigation Supply

³ For detailed definitions, please refer to Attachement 1.1, IWMI/RTDB, 1998. Comparative Assessment in 7 selected schemes in Nepal, Part A.

Financial Indicators

- Fee Collection Efficiency
- Financial Self-sufficiency
- O&M Expenditures per unit of Land and Water

These indicators are more focussed on performance evaluation compared to evaluation of the joint management or management transfer process itself. Basically, different processes (interventions) related to management transfer programs have been treated as independent variables whose effects are measured in terms of the impact on the performance⁴. The management transfer intervention processes are being recorded in form of other action research activities such as: rehabilitation study, process documentation, conjunctive water use study, institutional framework study, and so on. Further, performance evaluation is not only important for assessing the management transfer programs, but also for assessing the performance of irrigated agriculture as a whole. Thus, an M&E system designed for assessing the performance has a wider use and can be expected to draw larger attention and acceptance.

The data installed in the suggested M&E database are of 21 irrigation schemes. Among turned over irrigation systems are:

1. Bhairahwa Lumbini Groundwater Tube Well # W/48, Ramgunj
2. Bhairahwa Lumbini Groundwater Tube Well # W/9, Muriyari
3. Marchwar Lift Irrigation System
4. Panchkanya Irrigation System
5. West Gandak Irrigation System

Others under joint management are:

1. Aanpchaaur Irrigation System
2. Banganga Irrigation System
3. Birlingtar Irrigation System
4. Chandra Canal Irrigation System
5. Chaurjahari Irrigation System
6. Haidinath Irrigation System
7. Hienja Irrigation System
8. Jhanj Irrigation System
9. Karnala Irrigation Project
10. Kantai Irrigation System
11. Khaperi Irrigation System
12. Koshi Pump Irrigation System
13. Manusmara Irrigation System

For more information on performance indicators, please refer to: Molden, et. al. 1998, Indicators for Comparing Performance of Irrigated Agricultural Systems, IWMI, Colombo, Sri Lanka.

14. Mohana Irrigation System
15. Pathraiya Irrigation System
16. Sunsari Morang Irrigation Project – Jhumka Division

ISSUES AND CONCERNS

Some issues and concerns noted in course of efforts of supporting DOI in establishing an appropriate M&E database are as follows:

- Variations in the scope of M&E under past initiatives
- Various measures for M&E
- Varying emphasis on M&E activities with respect to various management levels
- Institutional inability to handle M&E works timely and effectively.
- Less important or no feedback from the M&E system.
- Absence of regular flow of information into M&E and MIS Units from all irrigation projects and concerned DOI divisions.
- Lengthy and complicated formats for collecting and recording the relevant data.
- Poor data quality
- Inadequate data dissemination
- Shortage of skilled workforce and resources for such activities
- Lack of conceptual clarity on M&E activities leading to poor selection of M&E key indicators, time framework of data collection, methods of data collection, etc.
- Often, data are not collected on a regular basis that leads to gaps in the time series (See table 1.1 for a general idea on record availability).
- Some irrigation systems (e.g. Hemja) have combined budgetary figures. So, system wise budgetary figures are not available.
- Lack of commitment and determination from decision makers and managers to seriously monitor and evaluate irrigation projects

Table 1.1: Record Availability at Various Irrigation Systems over Last Five Years

Name of the system	Data on agriculture performance	Data on O&M budget & expenses	Data on ISF target	Data on ISF collection	Data on alternative income	Data on discharge rate	Data on discharge by Volume
IMTP Sites							
Panchkanya I.S.	✓	✓	✓	✓	✓	✓	X
Khageri I.S.	✓	✓	✓	✓	✓	✓	X
Nepal Gandak I.S.	✓	✓	✓	✓	✓	✓	X
Chandra canal I.S.	*	✓		*	*	✓	X
Manushmara I.S.	*	✓	*	*		✓	X
Bazganga I.S.	*	✓					
Hardinath I.S.		✓					
Mohana I.S.		✓					
Pathraiva I.S.		✓		*			
Kamala I.S.	*	✓				✓	X
Chaurjahari I.S.		✓				✓	
Other systems							
Kankai I.S.		✓				✓	X
Handetar I.S.	*	✓	*	*			
Hemja I.S.							
Koshipump I.S.		✓					
Bulingtar I.S.		✓					
Jhani I.S.		✓					
Aanpchaar I.S.		✓				✓	X
Marchwar L. I.S.	✓	✓	✓	✓	*	✓	X
BLGWP (two TWs)	✓	✓	✓	✓	*	✓	X
Sunsari Morang I.P.	✓	✓	✓	*	✓	✓	X
Rampurphant I.S.		✓					

✓ – Information available; * - Information partially available; X – Not kept as record but can be calculated based on other info.

GIVING CONTINUITY

The indicators discussed in section 2 have been selected on the basis of IWMI's wide experience on performance evaluations in different countries. Due care has been taken to upgrade the existing M&E system in a manner that would require minimal set of information that can provide most usable inferences.

There are many other agencies that are engaged in collecting and recording similar, and sometimes even the same, irrigated agriculture related data. For instance, the Nepal Rashtra Bank keeps record of currency values and inflation rates that are helpful in financial analyses. Similarly, the Department of Agriculture, Central Bureau of Statistics, Agriculture Development Bank, Agricultural Cooperatives, Department of Hydrology and Meteorology, etc. are engaged in collecting varieties of data that can be used for evaluation of irrigated agricultural performances in various irrigation systems.

In order to avoid the duplication in the work, a mechanism for regular exchange of different data being collected by related agencies is necessary. Such exercises will also

complement as well as supplement to each other's data collection efforts. At the same time, it will facilitate resolving discrepancies, if any, in the data being reported. One of the effective ways for establishing such a data exchange mechanism could be through computer networking of their databases with the database of the DOI. The other measure could be periodic exchange of data reports among related agencies on a regular basis.

Similarly, useful data are being collected at different levels of different organizations. For instance, the project offices have smaller details such as daily discharge measurements at the headwork, expenses made in specific activities related to O&M, etc. Likewise, the WUA's lower tiers have data related to the particular block of the command area. The data kept at higher levels generally are wholesome figures such as total O&M cost over a year, total ISF collection, etc. These wholesome figures are derived on the basis of the data and information provided by the lower levels. Thus, the data flow starts from the lower level and goes up in the organizational hierarchy.

However, the importance of data being collected at different levels may depend upon their usefulness at that particular level. That is, WUA keeps data on ISF collection and Fee collection rates, data on financial management, water management, and water flows because they need this info. DOI keeps records about O&M allocations and expenditures because they use them for budget planning for next year. Agricultural and water flow data are important for policymakers because they are useful for impact evaluations of interventions, defining scope of improvement in irrigated agriculture, developments in irrigated agriculture with the view of food security, water use in agriculture versus availability, competition with other sectors like hydropower, project selection for support services (credit, rehab, etc).

The data flow mechanism has to be through the database established by M&E and the MIS Units. This is also necessary for proper institutionalization of such units in the DOI leading to the institutionalization of the data flow process itself.

So, in order to build up an effective and useful database in M&E and MIS Units, located in Kathmandu, it becomes important to establish an effective reporting system from the field level of irrigation management. At the same time, it is very important to make these efforts justifiable for the data collectors, recorders, and senders at the lower levels. People at the lower levels of the organization must be convinced that such efforts are ultimately going to be useful at the same levels, which are deeply involved in the day to day management of the irrigation system. In other words, they are the end users of the established database. It will help in averting the general attitude of the people at the field level that the M&E efforts usually are from the clients and are for the purpose of people at the higher levels only. Similarly, once the data recording practice is started at the lower levels, people at that level will start realizing their use and importance into the management activities. It will help sustain the practices of record keeping and sharing with people at the higher levels from whom they expect various kinds of supports.

For fostering such an understanding among the field level people, support packages, for example in form of a post-transfer support program, should be designed on the basis of

the record keeping practices at the field level. For establishing an incentive system, projects maintaining and disseminating useful information should be given priority while extending post-transfer or joint management supports from the higher levels.

In addition, the revised questionnaires (formats) need to be widely circulated to all concerned at different levels of project management with explanation about potential use of the minimally sought data and their significance.

For the agency people at the field and intermediate levels, tasks such as collecting, recording, and disseminating the data should be projected as their basic duties and responsibilities.

Further, to ensure a regular data inflow into M&E and MIS Units, all the five points of the computer network in the DOI should be made responsible to keep loading the relevant data from their respective divisions on the data base. The data inflow rate into the database system should be monitored on a time series basis by the MIS Unit Chief and periodic reports should be submitted to all the concerned Divisional Heads.

MIS Unit is well equipped for installing the developed database and it has already been loaded on its computer. However, M&E Unit of SMB is still in need of an appropriate computer with necessary software. As the developed database is in MS Access 97, though being simpler, the associated person in the M&E Unit may also require some orientation to handle the software effectively.

FUTURE IMPROVEMENTS

Some 12 irrigation systems and many more tube wells are yet to be included in the list that are to go under full management transfer or joint management as directed by the prevailing policy, rules, and regulations in Nepal. Such updating is also necessary to provide the database system maintained by MIS and M&E Units as the basic information provider in the national context of irrigation for various policy-making and support extending purposes.

Similarly, the present database has only three sets of indicators. There is a lot of scope to enrich the database with many other kinds of information such as institutional development data, training information, staffing, equipment, flow data below the headwork, etc. However, caution should be taken to ensure that the added data set would not make the present data collection, recording, and dissemination works hectic and unsustainable. It is recommended that the present database be used for a while until a culture of effective data collection, recording, and dissemination is internalized.

While developing this database system, the checklist of different variables have been reduced to seek only the necessary information based on a few and simple indicators. In course of developing this database system, the questionnaires (formats used for M&E purposes, particularly for the systems under O&M) that were used by IMD and the MIS Unit for recording different sets of the data have also been modified (See Attachment

1.2). These questionnaires are meant for the biannual data collection as against quarterly ones that were in use previously. At present two sets of questionnaires have been developed for the purpose data collection: Surface irrigation systems and Groundwater irrigation system considering their technical differences. Some appropriate formats for data recording at field level have also been developed for maintaining uniformity in the formats and data collected therein.

The modifications have been made on the basis of the designed database system and the data types presently installed on the database. However, as the database is improved in due course of time, the corresponding questionnaires would need to be modified as well.

The database files are presently access-controlled, as they need a password to open them. However, it is recommended that the files be made "read only" files that can be opened by anybody but will need pre-assigned password for deleting, editing, or adding any more data. This provision is expected to prevent the database from being tampered by inauthentic users.

For the sake of improvement into the database, a data filtering mechanism can also be set, which will immediately prompt to reject unjustifiable and unrealistic entries. This will also help improve the data quality.

In addition, the financial data loaded on the database are not inflation corrected as they indicate figures of the specific years. For the purpose of longitudinal analyses, it will be necessary to equip the database with the Inflation Correction Factor.

FOLLOW UP

For effective institutionalization of the developed database system, it will be necessary to devise appropriate follow up activities in accordance to above recommendations on M&E system. For simplifying proper institutionalization of the database, three categories of the irrigation systems could be made depending upon the extent of data being collected and recorded in different irrigation systems. The systems having complete set of presently proposed data can be differentiated as belonging to the first category followed by the systems under second category having partial data. The systems with no updated records can be considered of the primary category. The main purpose of this categorization is to attain efficient database management enabling MIS and M&E Units to adopt necessary and appropriate follow up measures.

Accordingly, a phase wise program for enhancing the databases can be launched of which the present job could be taken as the first phase. While proceeding with the follow up program, the systems with better record keeping practices should be given priority under the second phase. The systems under the last category can come at the last

CONCLUSION

Well-institutionalized and sustained M&E system has often been the key concern. However, it does not depend upon any single factor. Proper demand for the data recorded in the M&E databases, regular flow of information into them, simplicity in getting access to the databases and quality of data on them, etc are all very important. First of all, people at different management levels who seek some information should have easy access to the database system and they should get something useful from it. Unavailability of such information on the database, or hardships in getting access to them, tends to divert the potential users to some alternative sources. This undermines the importance of maintaining a database. Once the information seekers start getting the desired information, the demand for such info loaded on the database fosters. Similarly, if such info are used back at different management levels, especially at the field level, the information providers at the lower levels start realizing the benefit of sending the asked data on a regular basis as well.

If there is a demand for data, people will collect data if data are useful for management, decision making at field as well as central level. In actual situation, now, demand is there but data are difficult to get. So, people get discouraged. So, the assumption is that if data are easily and widely available, demand will be created.

Further, simplicity in filling the formats through which various info are sought from different levels are also important as the complicated formats tend to annoy the data recorder and eventually adversely affects the extent of data collection and their quality.

Reference

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Attachement 1.1: Definitions of Performance Indicators

Agricultural Indicators

1. Output per cropped area (NRs./Ha) = Production/Irrigated Cropped Area (A_{cropped})
2. Output per unit command Area (NRs./Ha) = Production/Command Area (A_{net})
3. Output per unit irrigation Supply (NRs./m³) = Production/Diverted Irrigation Supply (V_{div})
4. Output per unit Water consumed (NRs./m³) = Production/Volume of Water consumed (V_{con})

Where,

Production is the output of the irrigated area in terms of gross value of production i.e. the sum of area multiplied by crop yields and local price,

Irrigated Cropped Area is the sum of the areas under crops during the time period of analysis,

Irrigated Command Area is the nominal or design area to be irrigated,

Diverted Irrigation Supply is the volume of surface irrigation water diverted to the command area, plus net removals from groundwater, and

Volume of Water Consumed by Corps is the evapotranspiration of crops.

Water related indicators

5. Relative Water Supply = Total Irrigation Supply/Crop Demand
6. Relative Irrigation Supply = Irrigation Supply/Irrigation Demand

Where,

Crop Demand = Potential crop ET, or the ET under well-watered conditions.

Total Irrigation Supply = Surface diversions plus net groundwater draft plus rainfall

Irrigation Demand = the crop ET less effective rainfall.

Financial Indicators

7. Financial Self Sufficiency (%) = Revenue from irrigation/Total O&M Expenditures
8. Fee Collection Rate (%) = Collected Fees/ Anticipated Fee Collection
9. O&M expenditures per unit of land = Total O&M Expenditures/ Command area(A_{net})

10. O&M expenditures per unit of water = Total O&M Expenditures/ Diverted Irrigation Supply (V div)

Where,

Collected Fees, is the annual revenue generated from water and irrigation fees paid by water users, excluding income from anterior debt payment and interest,

Anticipated Fee Collection, is the expected annual revenue generated from water and irrigation fees, as billed to water users, excluding anterior debts or interest,

Revenue from Irrigation is the revenue generated, either from government subsidies,

Total O&M Expenditures is the amount expended locally through O&M plus outside subsidies from the government.

Attachement 1.2: Modified Questionnaires and Formats

His Majesty's Government
Ministry of Water Resources
Department of Irrigation
Irrigation Management Division
System Management Branch

QUESTIONNAIRE FOR MONITORING OF O&M SURFACE IRRIGATION SYSTEMS FISCAL YEAR 2055/56

1. GENERAL

Name of the System:

Actual Irrigated Area in the last Summer: ha.

Canal Discharge (Please, specify the location and attach the sheet of record):

Shrawan (July/Aug.) lit/sec

Bhadra (Aug./ Sept.) lit/sec

Ashwin (Sept. /Oct.) lit/sec

Kartik (Oct./Nov.) lit/sec

2. OPERATION

Area under different crops and their production:

Paddy	.....ha	Production	..... MT/Ha
Wheat	.....ha	Production	..... MT/Ha
Pulses	.....ha	Production	..... MT/Ha
Oilseeds	.....ha	Production	..... MT/Ha
Sugarcane	.....ha	Production	..... MT/Ha
Vegetables	.....ha	Production	..... MT/Ha
Others	..... ha	Production	..... MT/Ha

3. MAINTENANCE

Please list the activities related to maintenance work done till date. (Meeting with WUA members/farmers, surveying of maintenance work, design and estimates, working procedure etc. Details of works performed up to the reporting period):

1.
2.
3.
4.

4. MONTHLY EXPENDITURE ON DIFFERENT BUDGET HEADINGS:

Months	Budget Heading				Remarks
	1.3	2.5	2.10	6.5	
Shrawan 2055					(July-August)
Bhadra					
Ashwin					
Kartik					
Mansir					
Poush					
Magh					
Falgun					
Chaitra					
Baishakh					
Jestha					
Ashar					(June-July)

5. IRRIGATION SERVICE FEE /MEMBERSHIP FEE COLLECTION

ISF collection target

Total amount of ISF collected till date

Total amount of Membership fee collected till date (Monthly details)

Total Income from other sources

Name of Project Manager/system in charge:

Signature: Date:

Name of O&M in charge: