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INDIA

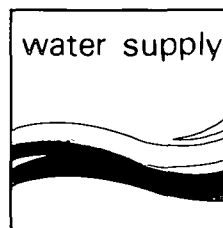
(UP-27)

Sector: Rural Water Supply

Introduction of Management Information Systems
in U.P. Jal Nigam



June 1991





DHV Consultants BV

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LIST OF ABBREVIATIONS

AE	Assistant Engineer
ARWSP	Accelerated Rural Water Supply Programme
BHU	Banares Hindu University
CE	Chief Engineer of Jal Nigam
DGIS	Netherlands DG of Development Cooperation
DWACRA	Development of Women and Children in Rural Areas
EDP	Electronic Data Processing
EE	Executive Engineer of Jal Nigam
EE & PA	Executive Engineer and Personal Assistant
GOI	Government of India
GON	Government of The Netherlands
HQ	Headquarters Jal Nigam
IRC	International Reference Centre
JE	Junior Engineer of Jal Nigam
MD	Jal Nigam Managing Director
MIS	Management Information System
NAPSU	Netherlands Assisted Programme Support Unit
NIC	National Informatics Centre
NICNET	National Informatics Centre Satellite data link
NIDC	National Industrial Development Corporation
NTMDW	National Technology Mission on Drinking Water
PSU	Programme Support Unit
RNE	Royal Netherlands Embassy
RWS	Rural Water Supply
RWS/S	Rural Water Supply and Sanitation
SE	Superintending Engineer of Jal Nigam
UP	Uttar Pradesh
UCCS	Uptron Computer Consultancy & Services
WACO	Water Coordinator RNE Embassy

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1 **INTRODUCTION AND ACKNOWLEDGEMENT**

During the Review and Support Mission (RSM) No. 26 of the Rural Water Supply and Sanitation Project to Uttar Pradesh, additional expertise accompanied the regular mission members. The objectives of this extension was to assess the feasibility of Management Information Systems (MIS) in Jal Nigam, the State Water Authority, and subsequently to define the methods and means of introducing MIS in Jal Nigam.

It was agreed that the Terms of Reference of the Institution Development and MIS Expert (See Appendix 1) were very ambitious and that full compliance would be highly dependent on the progress made since the last Review and Support Mission from November 1990.

The Mission visited India from April 23 until May 11, 1991, from which 5 days were spent in Delhi and 13 days in Lucknow (See Appendix 2). This report presents the main findings, conclusions and recommendations of the Institution Development and MIS expert.

The author very much appreciated the hospitality, support and cooperation which he received from Jal Nigam, the Programme Support Unit, the Royal Netherlands Embassy and other organizations visited during the Mission (See Appendix 3). Special thanks would go to Mr. Chaturvedi (resource person), Mr. Brijendra Sahai (early morning golf) and Ms. Nair (late evening shopping).

2 EXECUTIVE SUMMARY AND RECOMMENDATIONS

The objectives of the MIS identification mission UP-27, which took place from April 23 until May 11, were to assess the feasibility of Management Information Systems (MIS) for Rural Water Supply and Sanitation in Jal Nigam, and subsequently to define the methods and means of introducing MIS in Jal Nigam. The Lavrijsen report on MIS introduction in PRED Andhra Pradesh was taken as a starting point.

The approach adopted during the mission has taken Jal Nigam and its internal information processes as basis for possible MIS introduction. The reasons for this are that:

1. The chances of success with MIS will be maximum when it directly and fully addresses the information needs as expressed by Jal Nigam;
2. The information requirements to outside agencies can be easier complied with once the newly established MIS within Jal Nigam is operational.

Jal Nigam's present functioning shows various constraints incurred by sub-optimal flows of information. This hampers effective and efficient monitoring, control and feed-back processes and consequently makes strategic decision taking by Jal Nigam management extremely difficult. This sub-optimal flow of information is caused by the weakness of institutional and manpower monitoring arrangements as well as by the reporting system itself, set up to comply with internal and external information requirements.

The large number and the functionality of the monitoring units within Jal Nigam seem questionable, and the interrelations and cooperation with other units, both within headquarters and between the various levels, is not seldom missing. As clear cut responsibilities are lacking, monitoring activities are either duplicated or omitted altogether and hamper effective control and feed-back mechanisms as well as strategic decision taking by Jal Nigam management.

Reporting formats are the main instruments for monitoring and both internal and external reporting purposes. Problems identified with these reporting formats are various and refer to a number of problems: the inconsistent set-up of the reporting system, the submittance frequency of the formats, the large number of formats and type and number of questions asked per format. Due to the enormous reporting duties, field staff spends insufficient time on regular field work and becomes frustrated. Officers at zonal level and HQ find themselves surrounded by enormous piles of inaccessible, incomplete and sometimes incorrect information.

Jal Nigam supports computerization and MIS activities. Unfortunately, no clear computerization and MIS policies have been formulated and the development of software packages for both computerization and MIS seem to have been designed and developed in a rather isolated manner. Furthermore, the use of this software is to a large extent limited to the computerization unit(s) only.

Executive Summary and Recommendations

Only recently, Jal Nigam has received assistance on MIS introduction from both the Indo-Dutch programme through its Review and Support Missions (RSM) and from UNICEF. Since 1990 Jal Nigam, with assistance from UNICEF, has been working on a Computerization Plan to include all organizational levels.

In view of the on-going and planned MIS assistance from UNICEF and GON to Jal Nigam, regular consultations between RNE and UNICEF should take place to coordinate and streamline these supporting activities.

A number of preconditions for MIS introduction and a preferred scenario for MIS introduction were formulated and agreed upon by the Mission and Jal Nigam to be proposed for inclusion in the Indo-Dutch Programme.

1. MIS can only succeed if and when Jal Nigam management fully backs and takes appropriate action to change a number of institutional and manpower arrangements aiming at creating a receptive structure for MIS;
2. MIS is to be introduced for 1) monitoring of planning, construction and operation and maintenance of works, and 2) water quality control, geohydrological information and materials management;
3. A pilot project for MIS introduction will cover all RWS schemes in the 13 districts of Sub-Projects VI and VII. The reason for not including sanitation is the uncertain future of sanitation projects in Jal Nigam;
4. Training of staff and provision of hardware requirements for the proper implementation of the MIS pilot project is included for HQ level, zonal level and divisional level.

At the time this document was prepared, the proposal of Sub-project VII was still being discussed. As this sub-project is included in the MIS pilot project, the moment of approval of this sub-project could affect the start of the pilot project.

The workplan for implementation of the MIS pilot project covers six phases over a total period of 18 months and is based on a total cost estimate of Rs. 12,910,000.

3 BACKGROUND OF THE MISSION AND APPROACH

3.1. Introduction

The Government of the Netherlands (GON) through the Royal Netherlands Embassy (RNE), in a joint effort with the Government of India (GOI), are presently undertaking various Rural Water Supply and Sanitation Projects (RWS/S), notably in Uttar Pradesh (UP), Andhra Pradesh, Gujarat, Kerala and Karnataka.

The main objective of these projects is to assist these five state governments in providing safe drinking water to problem villages through an integrated approach. More encompassing than in a sectoral approach, the integrated approach aims at tackling the rural water supply problems through a mix of interrelated inputs to improve the quality of rural life. These inputs or focal points include water supply, sanitation, health education, community participation, women's involvement and institution development.

At state level Water Authorities of the above mentioned states are the nodal institutions for the planning, design, construction and operation and maintenance of the these RWS/S schemes. Jal Nigam is the Water Authority in Uttar Pradesh. Another key player in the Indo-Dutch Programme in Uttar Pradesh is the Netherlands Assisted Programme Support Unit (NAPSU or PSU). From the PSU office in Lucknow, its staff, assisted by the Banares Hindu University (BHU) and DWACRA, tries to complement Jal Nigam's predominantly technical inputs with non-technical inputs, like e.g. community participation and health education activities.

As the scope and scale of RWS/S activities have been increasing rapidly, it has become more and more difficult to manage them. For all the parties involved, there is a growing need to get regular, timely, systematic and correct information to take the necessary decisions. The introduction of Management Information Systems could possibly support these organizations in their decision taking processes.

Several activities have been undertaken to initiate the development of MIS within the framework of the Indo-Dutch Programme. The activities of the International Reference Centre (IRC) and the MIS-Identification mission of Mr. Lavrijsen to Andhra Pradesh and the present mission to Uttar Pradesh are the most salient activities. In addition, Jal Nigam and PSU themselves have also put considerable efforts in the development of MIS, supported by previous RSM (mission 23, 24 and 25) to Uttar Pradesh.

The background of expanding the RSM to Uttar Pradesh with MIS expertise was the decision taken by the Joint Meeting of RSMs on MIS in The Hague (February 4, 1991). The meeting identified the need to assess the MIS situation and needs in the various states taking the Lavrijsen report as a starting point.

3.2. Approach and workplan

In his report Lavrijsen rightfully states that the information needs of the RNE, the NAPSUs and the various Water Authorities for improved functioning and reporting may possibly have certain overlaps but will most certainly not coincide as all three organizations have their own mode of operation. There are quite distinct differences between these organizations. Notwithstanding the advantages of coordinated efforts and compatibility of future Management Information Systems, any system to be developed would have to be designed to suit the information needs of only one specific organization, and as a consequence, each organization would need its own system for management information.

In addition, the information requirements are quite diverse for the various organizations in type, frequency and use. Taking the example of the Water Authorities, information is needed for internal management and reporting purposes at various organizational levels (division, circle, zone and state headquarters) at various times (weekly, fortnightly, monthly, quarterly, annually) at different levels of detail (scheme, village, district, programme) for different uses (financial, physical, social, etc.). For external reporting purposes, various kinds of information are required to report to different (state and central) government organizations and funding agencies.

Taking into consideration the scope and scale of both the internal and external information needs for the proper functioning of Jal Nigam, one can not but conclude that the institutional set-up and staffing are becoming enormously strained. Through expanding its activities Jal Nigam will face more and more problems with its proper internal functioning. In addition, frustration will grow on complying with the diverse and growing external information requirements.

This issue has received particular attention in the present mission to Uttar Pradesh. The approach adopted takes Jal Nigam and its internal information processes as a starting point for possible MIS introduction. The reason for this lies in two basic assumptions:

1. The chances of success with MIS will be maximum when it directly and fully addresses the information needs as expressed by Jal Nigam;
2. The information requirements to outside agencies can be easier complied with once the newly established MIS within Jal Nigam is operational.

In determining the feasibility of MIS within Jal Nigam and the subsequent identification of a possible scenario for implementation, the detailed methodology used covered the following sequential activities:

1. Explain the objectives and scope of the MIS mission to Jal Nigam
2. Determine the MIS priorities as expressed by Jal Nigam
3. Assess the effectiveness and efficiency of actual information systems
 - institutional set-up and procedures
 - manpower arrangements

Background of the Mission and Approach

4. Assess the effectiveness and efficiency of present MIS initiatives
 - progress reporting formats
 - unplanned computerization activities
 - Jal Nigam computerization plan
5. Review the MIS supporting activities from outside agencies
6. Review the MIS activities within RNE and PSU
7. Assess the future requirements for MIS scenarios in terms of:
 - institutional set-up and procedures
 - manpower arrangement
8. Formulate proposal and workplan for MIS introduction in Jal Nigam.

4 JAL NIGAM AND MIS DEVELOPMENT EFFORTS

4.1. Introduction

During preliminary discussions with Jal Nigam the objectives of the mission were explained and a detailed workplan was prepared. The first follow-up meeting was held with the Jal Nigam Computerization Monitoring Committee, consisting of Secretary Management, SE Research & Development, Manager Monitoring, Manager Training, Manager EDP and the Chief Accounts Officer.

Based on the "Draft Approach Paper on Computerization in UP Jal Nigam" the Committee identified the following priority areas for MIS introduction:

- Works Monitoring (including planning, construction, operation and maintenance of works, drinking water quality monitoring, and geo-hydrological information);
- Materials Management; and
- Financial Management.

This request has been taken up by the mission and it was mutually agreed to concentrate the mission's efforts on these potential MIS areas. In view of the GON involvement in Jal Nigam, the efforts would focus on rural water supply, rural sanitation and maintenance only. Outside the scope of the mission therefor would be Jal Nigam's activities in urban water supply, urban sewerage, and deposits (water supply, sewerage and sanitation services to a.o. police, prison and medical organizations).

Within the rural water supply sector, various hand-pumped (HP) and piped (P) water supply programmes are being implemented by Jal Nigam, notably:

- | | |
|----------------------|---------------------------------|
| - State financed | - Minimum Needs Programme (HP) |
| | - Harijan Basti (HP) |
| | - Drought (HP) |
| - Central Government | - ARWSP (HP) |
| - Bilateral Aid | - Indo-Dutch Programme (HP & P) |
| - Multilateral Aid | - World Bank (HP & P)(proposed) |

Jal Nigam strongly advocated not to restrict the mission's scope to the Indo-Dutch programme, but instead take all rural water supply programmes into consideration, as the potential impact of a more comprehensive approach would certainly contribute more to improving Jal Nigam's monitoring activities, decision taking processes and reporting activities.

4.2. Organizational structure and institutional arrangements

Jal Nigam is a state corporation responsible for the planning, design, construction and operation and maintenance of water supply schemes in Uttar Pradesh. Jal Nigam is responsible for urban water supply, urban sewerage, rural water supply, maintenance and deposits (police, prison, medical and others). The organization chart is presented in Figure 1.

Headed by the chairman, who is presently also managing director and finance director, Jal Nigam employs around 15,000 staff. Jal Nigam Headquarters is located in Lucknow with special departments for Planning, Appraisal, Construction, Legal, Finance, Administration and Computerization. Zonal offices are established to cover 6 geographical areas, managed by Chief Engineers (CE) and situated in Allahabad, Lucknow, Gorakhpur, Agra, Dehradun and Nainital. Each of the zones has a representative (Executive Engineer/Personal Assistant (EE & PA)) at Jal Nigam Headquarters in Lucknow. Next in line to the zones are the circles totalling up to 40, 27 civil circles, 7 electrical and mechanical circles and 6 project circles, which are headed by Superintending Engineers (SE). Circles are divided into Divisions which are administered by Executive Engineers (EE). The EE is assisted by Assistant Engineers, Junior Engineers and draughtsmen at divisional level and further at Tehsil, Block, Village and Scheme levels. There are 135 construction (and maintenance) divisions, 25 electrical and mechanical divisions and 19 project divisions plus a number of units (Ganga Pollution, World Bank and Unicef). As in Andhra Pradesh the EEs are the operational backbones of Jal Nigam. Both financial and physical operational activities are centred around the EEs at divisional level.

4.3. Monitoring and reporting

4.3.1. Institutional set-up and staffing

Jal Nigam carries out monitoring and reporting activities for both internal and external purposes.

Within the organization all levels are involved in these monitoring and reporting activities. Monitoring at headquarters is carried out by the Monitoring Unit and the EEs & PAs to the respective CE at headquarters, the EEs & PAs to the respective CEs at zonal level and the Superintending Engineers at circle level. Coordination at headquarters is to take place between the Monitoring Unit and the Planning, Finance and Execution Units. Data collection and processing in the day to day operations and monitoring and decision taking is carried out by the EEs at divisional level. For linking physical with financial progress, these officers are to work closely together with the Accounts section at headquarters, the zonal accounts advisers, and the divisional accounts advisers.

The total number and the functionality of the monitoring units seems questionable, and the interrelations and cooperation with other units, both within headquarters and between the various levels, is not seldom missing. There seems to be a general feeling that the same monitoring activities are being done by the other. As monitoring of the internal functioning of HQ units is hardly exercised, most of the staff have hardly any work and may not know what they have to do. Except for occasional reviews as regards the overall situation, there are hardly any continuous efforts for inter-linkages and exchange between the various monitoring units and between these monitoring units and the Planning, Finance and Execution units. As clear cut responsibilities are lacking, monitoring activities are either duplicated or omitted altogether and hamper effective control and feed-back mechanisms.

It goes without saying that, because of these poorly functioning mechanisms, effective and efficient strategic decision taking by Jal Nigam management becomes close to impossible. This situation is particularly serious as the Finance Department at headquarters shows a vacancy percentage of around 50 %, including a vacant position of the Financial Manager (presently added to the tasks to the Chairman).

Overall, the present institutional set-up and staffing for monitoring show constraints both within and between units. When the proper internal functioning of units is hampered for reasons both internal and external of these units, effective inter-relations between units are seriously hampered. As a consequence, with several parallel systems in existence, efficient internal monitoring, reporting, control, feed-back and strategic decision taking become virtually impossible.

4.3.2. Reporting formats

One of the main instruments for monitoring are the reporting formats. At present there are a large number of formats in existence to be kept manually by Jal Nigam staff. There are several different formats for planning, construction and operation and maintenance of water supply schemes. Financial and physical matters are sometimes in separate formats and sometimes in integrated formats. Although efforts are being undertaken to improve these formats, this has not yet led to a functional and systematic approach towards data collection, data processing and interpretation of information.

Problems identified with these reporting formats are various and refer to problems related to the logical set-up of the reporting system, the frequency of the formats, the number of formats and type and number of questions asked per format.

- There is no logical framework in which the formats are developed. Neither a standardized set-up of formats nor a coding system of these formats is being practised.
- Reporting formats are sometimes added or modified by one of the monitoring units without communicating this to other relevant units, and as a result old formats are not always discontinued.
- Project specific reporting formats for external reporting purposes are being used in addition to the regular Jal Nigam formats;
- The frequency of these formats vary from weekly submittance to fortnightly, monthly and quarterly reporting formats. With a number of these formats, the functionality of their frequency does not seem to be clear.
- The number of questions asked per format is often too high and several formats show considerable overlaps.
- Often relatively fixed information is repeatedly asked and is included in the format as a separate column in stead of in the format's heading.
- Most of the formats have a structure which does not take into account the potential future use for computerized data-entry and processing. System analysts do not participate in the design of these formats.

For external reporting purposes Jal Nigam is requested to provide a great variety of information to a number of organizations, various donor organizations as well as state and central Governments, Departments and Assemblies. These information requirements are catered for in special formats (separate formats for each donor) like for programme or project wise reporting, reimbursement claims and monthly accounts. Although these forms mostly follow regular formats and time-tables, additional information is not seldom required on an ad-hoc basis and of a very detailed nature. Often these ad-hoc questions are not answered by Headquarters with the available data, but are directly sent through to lower levels (even to divisional level), adding to the already high workload of the field officers who are to collect the required data.

As a result of these information requirements, the workload of the field officers increasingly grows. These officers find themselves with enormous data-collecting and administrative tasks in filling in and forwarding all those formats. This has led to insufficient time spent on regular field work and frustration, incorrect information, data filled in without field visits and less-than full division/scheme/programme coverage of submitted formats. Consequently, officers at zonal level and headquarters are not able to get a clear and full picture of the schemes and programmes. At the same time they find themselves surrounded by enormous piles of inaccessible information. The only thing they can do is to gather information, compile it and transmit it onwards. These officers find themselves unable to exert proper monitoring, control and feedback and as a consequence management decisions are taken for which the right basis is lacking.

Recently, several efforts have been made to improve the Jal Nigam reporting system. In particular the reporting formats for Operation and Maintenance (O & M) in hand pumped schemes have been looked into and modified with assistance from PSU. Although these new formats have been tested in a few districts (in Sub-project VI, Lakhimpur Kheri), further pilot testing in more districts is yet to be initiated. Similar attempts have been made for the reporting formats for O & M in piped water supply schemes, but trial out of these formats is still being awaited in Sub-project VII.

Overall, Jal Nigam strongly advocates the rationalisation of all reporting formats for physical and financial aspects of planning, construction and operation and maintenance of rural water supply (RWS) schemes, as it acknowledges not only the present burden of the field staff to collect data but the need for systematic information flows for proper monitoring, control, feed-back and management strategic decision taking as well.

Jal Nigam staff expressed the need for one unit, preferably the Monitoring Unit, to bear full responsibility for the coordination of developing and maintaining a suitable system for all reporting formats and monitoring activities. Once this is done, the next step should be to define unambiguously the monitoring tasks and responsibilities of the various units at headquarters and zonal and circle level. Solving these institutional bottlenecks should receive the highest priority and support from the Jal Nigam top-management.

4.4. Jal Nigam computerization initiatives and external MIS assistance

4.4.1. External initiatives towards MIS

The National Technology Mission on Drinking Water (NTMDW) or Water Mission is a separate unit within the Department of Rural Development of the Ministry of Agriculture. The Water Mission aims to provide safe drinking water, in every village, on a sustainable basis. Apart from this, it deals with improving the performance and cost effectiveness of the on-going programmes of rural water supply (RWS). This is a gigantic task involving huge investments, and which requires close monitoring.

In 1987 the Water Mission assigned the National Industrial Development Corporation (NIDC) to develop an integrated computerized monitoring system for RWS. This system, set up for the monitoring purposes of the Water Mission, should be compatible with future systems for Water Authorities at state and district levels. At the same time, the system set-up should be flexible to cater for the needs of the Water Authorities. NIDC is presently testing this MIS, specially adapted to the various MIS needs, in Tamil Nadu, Gujarat, Sikkim, Karnataka and Haryana.

Once developed and operational, it is the Water Mission's intention to establish a network through which relevant information can be transmitted monthly from the districts (through the state headquarters) to the centre in Delhi. The infrastructure to be used for this purpose would be NICNET, the National Informatics Centre satellite data link, a nation-wide system which has been set up to provide the Planning Commission with data for national planning. For this purpose each district is planned to have its own NIC District Information Office with one Super AT computer and 3 to 4 terminals.

Financial assistance to the Water Mission for the nationwide introduction of MIS in the rural water supply sector is being received from amongst others UNICEF for the purchase of hardware, the development of suitable software packages and training.

Also within the Indo-Dutch programme, monitoring systems are becoming more and more important: both with the donor as well as with the implementing agencies. At present the GON provides assistance in the rural water supply and sanitation sector to five states, Uttar Pradesh (UP), Andhra Pradesh, Gujarat, Kerala and Karnataka. With the recent decentralisation of powers from the Ministry of Development Cooperation in the Hague (DGIS) to the Royal Netherlands Embassy in Delhi (RNE), as well as with the increase in scope and scale of activities, improvement of RNE monitoring activities has received more attention.

Since the first meeting in 1989 at the RNE on the development of MIS, a number of activities have been initiated. In the Netherlands, the International Reference Centre (IRC) is involved in the design of monitoring formats and introduction of MIS, to cater for the information needs of the Water Coordinator (WACO) at the RNE. In India, the Lavrijsen mission from

October/November 1990 also looked into the information requirements of the RNE. The main conclusions from these activities are that:

1. Any MIS should directly and fully address the information needs of one organization only, in this case the RNE;
2. Efforts towards design and development of a MIS should have built-in and regular links to the original objectives and RNE information needs;
3. The feasibility of a MIS for RNE is predetermined by the possibilities to obtain the required information.

In short, the information needs of RNE, Jal Nigam and PSU for improved functioning and reporting do not coincide as each of the three organizations have their own mode of operation. As a consequence, each organization would need its own system for management information. In the framework of the present mission, this means that any MIS for the RNE could only be meaningful designed and developed once the information needs and subsequent MIS development of Jal Nigam and PSU are taken care of.

The PSU system of data collection and processing is functioning quite effectively at the present level of operations. Several monitoring and performance indicators have been developed together with the BHU and DWACRA, including socio-economic indicators, village level organization for latrines and hand-pump maintenance, numbers of preventive maintenance mechanics trained etc. Through this computerized information system, PSU is able to provide the RNE with timely and accurate information for monitoring purposes. On the other hand, the present rather limited capabilities of Jal Nigam in terms of effective information systems may certainly delay the swift introduction of a comprehensive MIS at the RNE.

4.4.2. Computerization and MIS within Jal Nigam

Until 1985, computerization within Jal Nigam was limited to the Research and Development Unit in Jal Nigam Roorkee. Roorkee staff has developed several computerized engineering design systems to increase the productivity of individual Jal Nigam staff. The packages developed by Jal Nigam Roorkee include software for Water Supply Distribution Networks and the Structural Design of R.C.C. Overhead Tanks.

In 1985, Jal Nigam established an Electronic Data Processing (EDP) Cell, which presently employs 1.5 system analysts (EE), 2 programmers (AE), 2 console operators, 4 data entry operators, 1 steno and 1 peon. Vacancies exist for the post of EDP manager (SE) and 0.5 system analyst (EE). The EDP cell has designed a software package for Water Supply Status Information which is still being tested in the districts Fatehpur, Etawah and Ballia. Also for works monitoring, the PRISM project planning software package for piped water supply schemes, donated by GON, is being tried out in the preparatory activities of Sub-project VII. In addition, the EDP cell is presently developing software for financial management and personnel management for payrolls, accounts, balance sheets and bio-data respectively.

Jal Nigam and MIS development efforts

Jal Nigam does support computerization and MIS activities. Unfortunately, the top management is insufficiently aware of the concept of MIS. A clear understanding is lacking of the changing role of management decision taking and of the opportunities and the constraints which accompany the introduction of advanced information systems. As a consequence, no clear computerization and MIS policies have been formulated and the development of software packages for both computerization and MIS seem to have been designed and developed in a rather isolated manner. Furthermore, the use of this software is to a large extent limited to the computerization unit(s) only.

Jal Nigam is presently looking into a proposal to shift the responsibility for all computerization activities to the EDP cell, which would leave Jal Nigam Roorkee with its present staff and with only a regional support function. Unfortunately, no efforts seem to have been made to integrate the engineering/computerization expertise from Jal Nigam Roorkee staff with the relatively recent computerization expertise in the EDP cell. Likewise, nothing seems to have been formulated in terms of functional relations and/or supporting roles of the computerization unit(s) towards the other Jal Nigam units.

Notwithstanding these limitations, computerization efforts to improve monitoring activities have not been limited to the formal computerization units only. The need for proper monitoring tools is strongly being felt in the districts too, leading to very creative initiatives. In Kanpur district, the EE designed 2 input formats for computerization for hand-pumped and piped water supply systems from which 32 output formats can be obtained. In these formats data are included on overall planning (coverage), construction and operation and maintenance of the schemes. Initiatives like this should be taken up and supported by the Jal Nigam management. Jal Nigam should use this effort as a valuable input for its overall and coordinated endeavour to get a better monitoring system.

Since a relatively short time, Jal Nigam has received assistance on MIS introduction from both the Indo-Dutch programme through its Review and Support Missions (RSM) and from UNICEF.

Previous activities of the RSM in the field of MIS included a two-day workshop for Jal Nigam management staff. The main objective was to achieve a consensus on the necessity and/or desirability of improved information and communication flows within Jal Nigam. Several ideas were exchanged and suggestions were made for experimentation with a MIS. In addition, a set of improved reporting formats was jointly developed on the basis of the formats for hand-pumped operation and maintenance used in Lakhimpur Kheri district. Furthermore, a number of suggestions were made by the RSM to standardize and rationalise the Jal Nigam reporting formats and to thoroughly test these formats in the field before deciding to adopt these in all of Uttar Pradesh. As the RSM could only tackle these issues complementary to its regular activities, the mission successfully suggested to have an assessment made in a more profound manner through the addition of a MIS specialist to the regular RSM in UP-26.

Jal Nigam and MIS development efforts

Since 1990 Jal Nigam, with assistance from UNICEF, has been working on a Computerization Plan to include all organizational levels. A summary of the draft approach on computerization, released in April 1991, is presented in Figure 2.

Figure 2. Jal Nigam draft approach on computerization

NO.	TYPE OF ACTIVITY	DEVELOPED SYSTEMS	SYSTEM PLANNING	SOFT-WARE DEVELOPMENT
Computerization				
1	Water Supply Design	Distribution Network	3	Jal Nigam
2	Sewerage And Drainage Works Design	-	3	Jal Nigam
3	Structural Design	RCC Overhead Tank	7	Jal Nigam
MIS				
4	Drinking Water Quality	-	Not Yet	Jal Nigam
5	Geo-hydrological Info	-	Not Yet	Jal Nigam
6	Works Monitoring Operation & Maintenance	Construction WS Status Information	2	GON Unicef
7	Materials Management	-	3	Jal Nigam
8	Financial Management	Payrolls and Accounts & Balance Sheets	12	Jal Nigam
9	Personnel Management	Bio-data	2	Jal Nigam

One of the main features of the plan is that it comprises both computerization activities and activities towards the establishment of Management Information Systems. Although the plan is still in draft, several questions are still to be answered. Matters which still need urgent attention include the formulation of an overall policy on MIS, the responsibilities of the EDP Cell in relation to the other units within Jal Nigam on matters like system analysis, system design and development, and the operation and maintenance of the systems. As for staff training no training programme for the computer users has yet been defined in detail. In addition, the computerization plan makes no mention to improve the knowledge and skills of the EDP staff in the mammoth tasks they are facing, in particular to system analysis, the development of application software and the training of EDP staff to become trainers/counsellors of the future computer users. With respect to the planning of computerization and MIS

Jal Nigam and MIS development efforts

activities, the timing of the design, development, testing and full implementation of the various systems show only little of a serious review of priorities, institutional prerequisites and manpower requirements.

In discussions with UNICEF during the present mission, it became clear that UNICEF has envisaged near-future assistance to MIS development in Jal Nigam. First of all, UNICEF is to supply Jal Nigam with the Kardex system for operation and maintenance monitoring for hand pumps.

Secondly, an assessment will be carried out in the third quarter of 1991 by a local consultant to cover the entire Jal Nigam organization. The aim of this study is to determine the feasibility of MIS introduction in Jal Nigam. The scope of this assessment will therefore be much larger than the present one, which covers rural water supply and sanitation (RWS/S) only. For this reason, any assistance to the Jal Nigam Finance Department on MIS introduction at this stage would not only be based on a partial analysis of the Finance Department but would also be overhasty. On the other hand, Jal Nigam perceived present Indo-Dutch assistance to MIS introduction for works monitoring (planning, construction and operation and maintenance) and materials management as a high priority which did not allow for further delay.

At present Jal Nigam has the availability of the following hardware:

- Jal Nigam HQ:
 - 1 PC AT (4 MB Ram) with printer (donated by UNICEF)
- Jal Nigam EDP Cell:
 - 1 S-32 minicomputer (4 MB Ram and 160 MB Hard disk) with four terminals, 1 console and one line printer 600 l.p.m.;
 - 1 PC AT (2 MB Ram and 20 MB Hard disk) with 1 dot matrix printer (donated by GON);
 - 1 PC XT (640 KB and 20 MB Hard disk) with printers;
 - 2 Off line data entry machines;
 - 1 PC AT (4 MB Ram and 100 MB Hard disk) and 1 printer (donated by UNICEF)
- Jal Nigam Training Centre:
 - 1 PC AT (2 MB Ram) with printer (donated by UNICEF)
- Jal Nigam Electrical and Mechanical Store Unit:
 - 1 PC XT (1 MB Ram) with printer (donated by UNICEF)
- Jal Nigam Roorkee:
 - unknown
- Jal Nigam Circles:
 - Mirzapur:
 - 1 PC XT (640 KB Ram) with printer (donated by UNICEF)
 - Jhansi:
 - 1 PC XT (640 KB Ram) with printer (donated by UNICEF)

In order to support the use of computers, the Jal Nigam Training Centre has initiated several computer/MIS training courses. In 1990 and 1991, the following courses were held.

Jal Nigam and MIS development efforts

1. Jal Nigam financed training:

- Use of computer & programming in Kanpur, 17-19 August 1990, for 14 trainees (13 CE/SE, 1 AE);
- Use of Personal Computer in Roorkee, 17-22 September 1990, for 17 trainees (4 CE/SE, 7 EE, 6 AE);
- Training on computer in Lucknow, 9-14 October 1990, for 18 trainees (2 CE/SE, 7 EE, 5 AE, 4 JE);
- Computer Project Management in Lucknow, 14-19 January 1991, for 23 trainees (3 CE/SE, 7 EE, 13 JE).

2. Netherlands assistance training:

- Workshop on MIS introduction in Lucknow (3 and 14 May 1990), for 30 trainees (MD/CE/SE);

The UP Training Centre has already scheduled the following computer/MIS training courses for 1991 and 1992:

1. UNICEF assisted training programmes:

- Computer training for Lotus 123 in Lucknow, 6-9 January 1992, 8 trainees (EE, AE and JE);
- Computer training for Word Processing in Lucknow, 14-17 January 1992, 8 trainees (EE, AE, JE);
- Computer training for Data-Base in Lucknow, 21-24 January 1992, (AE, JE);
- Training on use of Kardex in Lucknow (26-27 June 1991), Meerut (25-26 July 1991) and Jhansi (18-19 July 1991), 60 trainees (EE, AE, JE, store keepers);
- Training on computer use in Lucknow (6-10 May and 17-23 June 1991) and in Jhansi (2-9 July 1991), 22 trainees (SE, EE, AE, JE);

2. Government of India and IPM Cell:

- Computerized Project Management in Lucknow (18-20 December 1991), 20 trainees (SE, EE, AE).

5 PROPOSAL FOR THE ESTABLISHMENT OF A MIS

5.1. Introduction

During the final discussions with Jal Nigam, both a number of preconditions for MIS introduction and a preferred scenario for MIS design, development and implementation were formulated and agreed upon. As in Andhra Pradesh, the information system is to address the internal information needs of Jal Nigam, as only then maximum results can be expected. As a consequence of this institutional approach focusing on Jal Nigam, the mission did only slightly look into the existing information systems and needs from the RNE and PSU.

This chapter presents a number of necessary institutional and manpower arrangements prior to MIS introduction, the areas of MIS introduction and a phased workplan for implementation, a proposal for monitoring and evaluation of the MIS implementation, the training and hardware requirements, as well as a cost estimate.

5.2. Institutional and manpower arrangements for MIS introduction

The present institutional set-up and staffing for monitoring show serious constraints both within and between units. Improvement of this situation is basically a "conditio sine qua non" for MIS introduction. Notwithstanding a number of relevant efforts presently being undertaken by Jal Nigam, the introduction and implementation of MIS may become a very hazardous activity, unless and until the Jal Nigam management fully backs and takes appropriate action to implement a number of institutional and manpower actions. The foremost important arrangements which should be made include the following:

- Designate one unit, preferably the G-II Monitoring Unit, to become responsible for the coordination of all Jal Nigam monitoring and reporting activities;
- Redesign the institutional set-up of the six EE & PAs to the CEs at HQ Jal Nigam to become one separate unit;
- Define the responsibilities and tasks of all monitoring and reporting units at HQ, zonal, circle and divisional levels, to include clear guidelines for programme-wise and scheme-wise monitoring, control and feed-back at the various levels;
- Review office orders on information provision to improve the procedures for design, modifications and submittance, and submittance frequency of reporting formats;
- Define (limited supporting) responsibilities and tasks of the EDP cell in relation to the various monitoring units in terms of system analysis, system design, development and system operation and maintenance;
- Select and appoint a Manager of the EDP cell and the second full time system analyst;
- Redefine the responsibilities and tasks of the EDP cell and Jal Nigam Roorkee, making fullest use of and possibly integrating Roorkee computerization expertise in the EDP cell;

It goes without saying that, once these internal institutional and manpower arrangements have been made, an extensive training programme will have to be initiated, as there is only limited experience on MIS and computer use within Jal Nigam. Training subjects should include awareness of MIS concepts, the changing role of management, general computer use, spreadsheet and database software packages and the use of application software.

For outside agencies and organizations involved with Jal Nigam operations, a number of matters should be looked into as well.

First of all, the various national and international funding agencies should try to coordinate their efforts and assistance towards computerization and Management Information Systems in Jal Nigam. In this respect, donor coordination between organizations like UNICEF and the GON should aim to streamline their MIS assistance programmes to Jal Nigam.

Secondly, these outside agencies should try to limit and streamline their information requirements towards Jal Nigam. Already a lot of time and money is being spent on internal reporting, putting a lot of strain on the Jal Nigam staff. The numerous and different reporting formats imposed by these organizations only aggravates this situation.

5.3. Scope of understanding for MIS introduction

As stated in section 4.1., Jal Nigam had formulated three priority areas for MIS introduction to the mission, being works monitoring, materials management and financial management for all rural water supply and sanitation (RWS/S) schemes. Works monitoring was thereby to include monitoring of planning, construction and operation and maintenance of works, water quality control and geo-hydrological information.

During the final discussions in Lucknow, the mission and Jal Nigam agreed to include in the proposal for Dutch MIS assistance:

1. MIS assistance for monitoring of planning, construction and operation and maintenance of works, water quality control, geohydrological information and materials management. The main reason for excluding financial management is the planned comprehensive organizational analysis for MIS introduction in Jal Nigam financed by UNICEF. The scope of the present mission did cover only part of Jal Nigam's sectors of operations, leaving out urban water supply, urban sewerage and deposits. The comprehensive analysis financed by UNICEF will prove a much better basis to assess the feasibility of a MIS for financial management;
2. Design and implementation of computerized MIS for rural water supply (RWS) schemes only. All existing and new RWS schemes, both piped and hand-pumped, are to be covered in the MIS, regardless of the financing agency. The reason for not including MIS assistance for sanitation is the rather uncertain future of sanitation projects to be carried out by Jal Nigam;

3. A pilot project for MIS implementation will cover all RWS schemes in the 13 districts of Sub-Projects VI (hand-pumped schemes) and VII (piped water supply). After an evaluation of this pilot project a decision will be taken whether or not the system will be introduced in the whole of Uttar Pradesh;
4. The MIS pilot project will be implemented in partially overlapping phases: software development and subsequent start of implementation will take place first for works monitoring (planning, construction and operation and maintenance) and secondly for water quality control, geohydrological information and materials management;
5. Training of staff at HQ, zonal and divisional level will be provided through various courses on MIS and computer use. Various training courses are to be implemented for management, system analysts, computer programmers, data entry, data processing and data manipulation staff, both technical and administrative staff and Jal Nigam management;
6. The provision of hardware requirements for the proper implementation of the MIS pilot project is included for HQ level, zonal level and divisional level, to include personal computers, printers, UPSs, Voltage stabilisers, and additionally also for the divisional levels air-conditioners and generator sets;
7. Upon completion of the pilot project an evaluation will be carried out to include an evaluation of the institutional and manpower arrangements for MIS, an impact analysis of computer and MIS related staff training, and an evaluation of MIS software development and MIS implementation.

5.4. Workplan for implementation

In view of the planned comprehensive organizational assessment towards computerization and MIS in Jal Nigam, financed by UNICEF, the present workplan for MIS implementation has been designed flexible to cater for any modifications, based on the results of the UNICEF assessment. As these results are expected around August 1991, the mission feels that the implementation schedule of the workplan will neither interfere nor have negative effects on this. If needed, the workplan could even be adapted to these results.

An issue which could affect the implementation of the MIS pilot project is the approval of Sub-project VII. At the moment of preparing this document, the proposal for Sub-project VII is still being considered. However, it is assumed that approval will take place on short notice, so that this matter need not delay the start of the MIS pilot project.

The workplan for implementation of the MIS pilot project is graphically presented in Figure 3 and covers 6 phases over a period of 18 months. For each of the 6 phases a distinction has been made by type of activity, notably institutional, manpower and training, and MIS activities.

Proposal for the establishment of a MIS

Figure 3. Workplan for MIS implementation

PHASE	INSTITUTIONAL	MANPOWER/TRAINING	MIS ACTIVITY	DURATION
0	Define tasks and responsibilities of Monitoring Unit and other units/levels for monitoring and reporting	Appoint EDP manager and 2nd full-time system analyst	-	
1	Define responsibilities EDP Cell in relation to the technical units Define procedures and regulations for reporting and reporting formats	Training/Attachment EDP Staff - System Analysis Training Management on MIS-concepts and changing role of management	Determine information needs	2 Months
2	Define procedures and regulations for reporting and reporting formats	Training MIS operational staff - Introduction computer use Training/Attachment EDP Staff - Application Software	Rationalise formats and system design - Number - Contents - Frequency	3 Months
3	-	Training MIS operational staff - Application Software I	Software design & development works monitoring - Engineering Staff - Local Consultants - EDP Staff	4 Months
4	-	Training MIS operational staff - Application Software I - Application Software II	Start implementation MIS works monitoring - Engineering Staff - Local Consultants - EDP Staff Software design & development materials, water quality, geohydrology - Engineering Staff - EDP Staff	4 Months
5	-	Training MIS operational staff - Application Software II	Continue implementation MIS works monitoring - Engineering Staff - Local Consultants - EDP Staff Start implementation MIS materials, water quality, geohydrology - Engineering Staff - EDP Staff	4 Months
6	Evaluation institutional arrangements	Evaluation/Impact analysis training	Evaluation MIS implementation	1 Month

With the present level of expertise, both quantitative and qualitative, Jal Nigam will certainly need considerable outside support, both financially and technically, for system analysis and for the design, development and operation and maintenance of the proposed MIS. The set-up of the workplan includes provision of financial assistance for training of staff and the purchase of hardware (see also section 5.5.) and for financing technical assistance for

monitoring and for an Indian MIS consultants organization to Jal Nigam.

The mission proposes a monitoring and evaluation set-up by means of:

- Day-to-day monitoring of the Jal Nigam Computerization Monitoring Unit;
- Three bi-annual joint monitoring missions by one consultant on behalf of the RNE and one representative of the Computerization Monitoring Unit (around month 0, 6 and 12).
- One joint evaluation mission (at month 18) by one consultant on behalf of the RNE and one representative of the Computerization Monitoring Unit (see phase 6).

In view of the experience of the National Industrial Development Corporation (NIDC), it seems appropriate to select this consultancy company to assist Jal Nigam in carrying out major parts of the MIS pilot project.

The proposed input for MIS consultancy will gradually change over the 18 months of the pilot project. Provision is made for consultancy assistance with major implementing tasks and a high degree of responsibility during one entire MIS project cycle for MIS works monitoring (information needs analysis, format review, system analysis, system design, software development and implementation). Next to this, a different type of assistance, more in terms of guidance rather than execution, will be given by the consultants to the design and development of other MIS, being for materials management, water quality, and for geo-hydrological information. As Jal Nigam staff will be trained on-the-job by NIDC staff in the establishment of the MIS for works monitoring, Jal Nigam would be capable of playing a more pronounced role in the later stages of the pilot project.

Training of Jal Nigam staff is going to a major undertaking as presently only limited computer experience is available. The envisaged training programme will include both on-the-job and off-the-job training courses for the Jal Nigam management, future computer users as well as for staff from the EDP cell (see also section 5.5.).

Phase 0

A special phase 0 has been included to signify the urgency of institutional and manpower arrangements to create a sufficiently receptive structure within Jal Nigam for MIS introduction (see section 5.2.). Notwithstanding several efforts undertaken to realise these modifications, the Jal Nigam management will have to express its wholeheartedly support to this and should take the necessary actions to facilitate implementation of these institutional and manpower arrangements.

Although these arrangements are envisaged for both phase 0 and phase 1, the mission feels that the pilot project could start once Jal Nigam management has taken concrete steps to comply with the requirements of phase 0, being:

- To designate the Monitoring Unit, to become responsible for the coordination of all Jal Nigam monitoring and reporting activities;

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- To redesign the institutional set-up of the six EE & PAs to the CEs at HQ Jal Nigam to become one separate unit;
- To define the responsibilities and tasks of all monitoring and reporting units at HQ, zonal, circle and divisional levels, to include clear guidelines for programme-wise and scheme-wise monitoring, control and feed-back at the various levels;
- To appoint the EDP manager and a second full-time system analyst.

The present proposal has envisaged one monitoring exercise at the end of phase 0. Apart from assessing the progress achieved in resolving the above mentioned institutional and manpower matters and possibly refining the present proposal based on the results of the UNICEF study, the joint monitoring team should also prepare Terms of Reference for the MIS consultancy and for the various components of the training programme.

Phase 1

As Jal Nigam management will have to support and facilitate the process towards MIS, a clear understanding of MIS concepts as well as of the changing role of management through MIS introduction are indispensable. A workshop on this will cater for these management training needs.

Institutional and manpower arrangements will continue to play a crucial role in creating a receptive structure for MIS introduction. As already stated in section 5.2. Jal Nigam management should make sure that the following activities are properly carried out:

- Review office orders on information provision to improve the procedures for design, modifications and submittance, and submittance frequency of reporting formats;
- Define (limited supporting) responsibilities and tasks of the EDP cell in relation to the various monitoring units in terms of system analysis, system design, development and system operation and maintenance;
- Select and appoint the Manager of the EDP cell and the second full time system analyst;
- Redefine the responsibilities and tasks of the EDP cell and Jal Nigam Roorkee, making fullest use of and possibly integrating Roorkee computerization expertise in the EDP cell.

Preceding the rationalisation of the reporting formats, the mission proposes to send the 2 system analysts either on an attachment or on a training course to improve their skills and knowledge for this purpose.

Also during phase 1, a final exercise will have to be carried out to determine the Jal Nigam information needs at all functional levels. This is a crucial activity preceding the review and modification of the reporting formats (phase 2). The information needs analysis should be executed very critically so as to prevent the workload of field staff to increase even more. This staff already spends far too much of its time on these data-collection and reporting duties.

Phase 2

Once the system analysts are properly trained off-the-job and the MIS consultants are in place, the reporting formats will be assessed and rationalised together with Jal Nigam engineering staff from the various organizational levels. Input from system analysts in this process, with assistance and on-the-job training by the MIS consultants, are indispensable to conform the new formats with computer requirements. Particular emphasis should be directed to the aggregation of data to cater for the information needs (including the level of detail) at the different levels in Jal Nigam. Again with respect to the high workload of field staff, efforts should be made to restrict design to only a limited number of formats. These formats should not only be easily pre-printed from the computer but should also contain data which should otherwise be filled in manually.

In these efforts maximum use should be made of both internal and external initiatives towards improved reporting formats, notably:

- the improved reporting formats operation and maintenance for hand-pumped schemes in Lakhimpur Kheri district;
- the format set-up of 2 input formats and 32 output formats in Kanpur district for hand-pumped and piped water supply schemes;
- defining and effectively using monitoring indicators on community participation and health education by PSU (a.o. water committees, site selection and maintenance) to be included in these formats.

The most important training need of the 2 EDP-programmers is how to develop user-friendly application software with menus and on-line help functions. Jal Nigam future computer users will not be served best by user-unfriendly software packages written in COBOL, which is common practice at this moment.

Also in phase 2, training activities will take off for future MIS operational staff at HQ level, zonal and divisional level, for both administrative and technical staff. These training activities would focus on introducing computer use to Jal Nigam staff and on increasing computer skills and knowledge in commonly used software packages on word-processing, spreadsheets and databases. UCCS, a division of state-owned UPTRON, is a nation-wide consultancy group providing a wide range of computer services including software education and training. UCCS has around 12 training institutes in Uttar Pradesh alone and seems both suitable and capable to provide these training services.

Phase 3

Software development will start as soon as the new formats are finalised and the EDP computer programmers have been trained (off-the-job). Again, this will have to be a joint effort with participation from the computer programmers, MIS consultants, as well as from relevant engineering staff. In this phase of system design and development of application software, MIS consultants should train the Jal Nigam programmers on-the-job.

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Like with the reporting formats, software development efforts should take into account the previous MIS initiatives, both from within Jal Nigam as well as from experiences from other relevant organizations. These include:

- the Jal Nigam computerized water supply information system, so far only tested in Fatehpur, Etawah and Ballia districts;
- the introduction in Jal Nigam of the PRISM project planning software package for piped water supply schemes;
- MIS efforts by the Water Mission and initiatives for other Water Authorities, initiated by the Indo-Dutch Programme;
- the MIS experiences (and lessons learned) of Water Authorities in Tamil Nadu, Gujarat, Sikkim, Karnataka and Haryana.

Phase 3, 4 and 5

Phases 3, 4 and 5, covering a period of one year, are stages in which software packages are subsequently designed, developed and implemented for a) works monitoring (planning, construction and operation and maintenance) and b) materials management and water quality control and geohydrological information. In these efforts, the role of Jal Nigam in relation to the MIS consultants will have to increase progressively, towards a situation in which the MIS consultants would restrict their input to advice and guidance of Jal Nigam and when necessary suggest corrective actions.

The training efforts will intensify during these stages through courses in the use of the newly developed application software. NIDC will be carrying out these courses. All MIS operational staff will be trained to increase their skills and knowledge of the general characteristics and use of the Jal Nigam MIS for data-entry and data-processing (Application software course I). A follow-up training course will focus on the more advanced applications of the MIS (Application software course II). Technical Jal Nigam staff will be instructed to perform a.o. various data manipulation and data interpretation activities.

Phase 6

The mission proposes to carry out an evaluation in the 18th and last month of the pilot project, considering institutional, manpower and training and MIS activities.

The evaluation should be carried out as a joint effort of representatives from the Jal Nigam Computerization Monitoring Unit, the Jal Nigam Monitoring Unit and the RNE. The evaluation team should assess the achievement of the objectives of the pilot project, assess the feasibility of full implementation of the MIS, formulate suggestions as to the possible modifications for design, development and operation and maintenance of these MIS and, if feasible, prepare a workplan for such full-scale MIS implementation for the whole of Uttar Pradesh.

5.5. Hardware and training requirements

The hardware and training requirements for the pilot project are based on the trial MIS implementation in all Jal Nigam divisions covered by the Sub-projects VI and VII of the Indo-Dutch programme. Sub-project VI aims at the provision of hand-pumped systems and covers 6 whereas Sub-project VII includes piped water supply schemes and covers 7 divisions. The wish to involve all divisions within these two sub-projects was expressed by Jal Nigam. In view of the magnitude of Jal Nigam activities in a huge and diverse state like Uttar Pradesh and the large number of construction divisions within the Jal Nigam organization, the selection of two sub-projects would offer a sound and representative basis and a good opportunity to properly test the introduction and operation of MIS.

Figure 4 shows the various Jal Nigam units and levels which are covered under the sub-projects VI and VII of the Indo-Dutch programme. All these units will participate in the MIS Pilot Project.

Figure 4. Units and levels involved in the MIS pilot project

LEVEL-UNIT	SP VI	SP VII	SP VI & VII
HQ - LEVEL			
G-II MONITORING	INCLUDED	INCLUDED	INCLUDED
G-II/CPO CONSTRUCTION	INCLUDED	INCLUDED	INCLUDED
G-I MATERIALS	INCLUDED	INCLUDED	INCLUDED
ZONE LEVEL			
CENTRAL-LUCKNOW	INCLUDED	INCLUDED	INCLUDED
KAMAUN-NAINITAL		INCLUDED	INCLUDED
WEST-AGRA		INCLUDED	INCLUDED
EAST-ALLAHABAD	INCLUDED		INCLUDED
GORAKHPUR-GORAKHPUR	INCLUDED		INCLUDED
DIVISIONAL LEVEL			
CENTRAL-ETAWAH		INCLUDED	INCLUDED
CENTRAL-LUCKNOW		INCLUDED	INCLUDED
CENTRAL-BAREILLY		INCLUDED	INCLUDED
CENTRAL-LAKHIMPUR	INCLUDED		INCLUDED
WEST-MAINPURI		INCLUDED	INCLUDED
WEST-BULANDSHAHR		INCLUDED	INCLUDED
WEST-FIROZABAD		INCLUDED	INCLUDED
EAST-BALLIA	INCLUDED		INCLUDED
KAMAUN-ALMORA		INCLUDED	INCLUDED
GORAKHPUR-GONDA	INCLUDED		INCLUDED
GORAKHPUR-BAHRAICH	INCLUDED		INCLUDED
GORAKHPUR-BASTI	INCLUDED		INCLUDED
GORAKHPUR-SIDHARTHANAGAR	INCLUDED		INCLUDED

5.5.1. Hardware requirements

The MIS pilot project will be implemented at the functionally most important organizational levels, being HQ level, zonal and divisional level. However, the physical infrastructure in which the various levels have to operate their MIS varies considerably. Especially the quality of the power supply and the environment where computers will have to be operated vary, with the least favourable circumstances at divisional level. Figure 5 presents the planned provision of a MIS hardware set to 3 units at HQ level (1 set for the six EE & PAs at G-II and CPO construction), 5 sets at zonal level and 13 units at divisional level.

All these units will be provided with the following hardware:

- 1 PC/AT 286 (40 MB Hard-disk and 1 MB Ram);
- 1 Dot matrix printer (132 col., 264 Cps);
- 1 Constant Voltage Stabiliser (750 VA);
- 1 Uninterrupted Power Supply (UPS) (625 AVR).

In view of the less favourable physical and infra-structural conditions, additional hardware will be provided to each of the 13 division, being:

- 1 Genset (2350 VA);
- 1 Airconditioner (1.0 ton, 1700 VA).

Figure 5. Hardware requirements by Jal Nigam level

	HQ	Zone	Division	Total
No. of PCs	3	5	13	21
No. of UPSs	3	5	13	21
No. of Stabilisers	3	5	13	21
No. of Printers	3	5	13	21
No. of ACs	0	0	13	13
No. of Gensets	0	0	13	13

5.5.2. Training requirements

Training will be provided both on- and off-the-job for all staff involved in the pilot project (see also section 5.4.).

Off-the-job training will involve Jal Nigam management, EDP system analysts and programmers and MIS operational staff. Figure 6 presents an overview of the off-the-job training programme, demonstrating the training courses, the trainee target groups, the training duration and whether or not a course will be a full-time (FT) or a part-time (PT) activity.

Figure 6. Pilot project off-the-job training programme

NO.	TRAINING COURSE	TRAINEES	DURATION (FT/PT)
1	MANAGEMENT TRAINING MIS	JAL NIGAM MANAGEMENT	2 DAYS FT
2	SYSTEM ANALYSIS TRAINING	EDP-SYSTEM ANALYSTS	1 MONTH FT
3	PROGRAMMERS TRAINING	EDP-PROGRAMMERS	1 MONTH FT
4	INTRODUCTORY COMPUTER TRAINING	ALL MIS OPERATIONAL STAFF	13 WEEKS PT
5	APPLICATION SOFTWARE TRAINING I	ALL MIS OPERATIONAL STAFF	1-2 WEEKS FT
6	APPLICATION SOFTWARE TRAINING II	MIS OPERATIONAL STAFF	1-2 WEEKS FT

All off-the-job training courses will be carried out by training consultants. However, in the preparation and implementation of these courses making maximum use should be made of the experience of staff from the Jal Nigam training centre as well as from the EDP cell, especially in courses 4, 5 and 6. One of the main aims of involving Jal Nigam staff in these training courses is to enhance the Jal Nigam training capabilities on computerization and MIS.

The total number of trainees from the various units and levels are shown in Figure 7. During the course of the pilot project a total number of 102 trainees will be trained once, twice or even three times, totalling to 242 trainee participation. HQ level trainees number 42 (92 participation), zonal level trainees are 21 (46 participation) and divisional level trainees total up to 39 (104 participation).

As elaborated in section 5.4. all MIS operational staff will be trained so to increase their skills and knowledge of general computer use (Course No. 4, Introductory computer training) the characteristics and use of the Jal Nigam MIS for data entry and data processing (Course No. 5, Application software course I). A follow-up training course will focus on the more advanced applications of the MIS (Course No. 6, Application software course II), in which technical Jal Nigam staff will be instructed to perform a.o. various data manipulation and data interpretation activities.

Apart from off-the-job training, the MIS consultants will provide extensive on-the-job training and guidance to Jal Nigam staff through out the entire duration of the pilot project. This guidance and on-the-job training will be given to monitoring staff at determining the Jal Nigam information needs (phase 1), monitoring staff and EDP system analysts in rationalising the reporting formats (phase 2) and programmers in developing application software (phase 3 and 4), as well as to MIS operational staff at the various levels in the operations and maintenance of the MIS (phase 4 and 5).

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Figure 7. Number of trainees per off-the-job training course

HQ - LEVEL	COURSE NUMBER AND NUMBER OF TRAINEES						TOTAL
	1	2	3	4	5	6	
EDP CELL	1	2	2		7	7	19
G-II (MONITORING)	1			5	5	4	15
G-II (CONSTRUCTION)	1			4	4	3	12
CPO (CONSTRUCTION)	1			4	4	3	12
G-I (MATERIALS)	1			3	3	2	9
APPRAISAL (WATER QUALITY)	1			3	3	2	9
E & M (GEOHYDROLOGY)	1			3	3	2	9
TOP MANAGEMENT/CEs	7						7
	14	2	2	22	29	23	92
ZONE LEVEL	1	2	3	4	5	6	TOTAL
CENTRAL (LUCKNOW)	1			3	3	2	9
KAMAUN (NAINITAL)	1			3	3	2	9
WEST (AGRA)	1			3	3	2	9
EAST (ALLAHABAD)	1			3	3	2	9
GKP (GORAKHPUR)	1			3	3	2	9
GARHWAL (DEHRADUN)	1						1
	6	0	0	15	15	10	46
DIVISIONAL LEVEL	1	2	3	4	5	6	TOTAL
CENTRAL (ETAWAH)				3	3	2	8
CENTRAL (LUCKNOW)				3	3	2	8
CENTRAL (BAREILLY)				3	3	2	8
CENTRAL (LAKHIMPUR)				3	3	2	8
WEST (MAINPURI)				3	3	2	8
WEST (BULANDSHAHR)				3	3	2	8
WEST (FIROZABAD)				3	3	2	8
EAST (BALLIA)				3	3	2	8
KAMAUN (ALMORA)				3	3	2	8
GKP (GONDA)				3	3	2	8
GKP (BAHRAICH)				3	3	2	8
GKP (BASTI)				3	3	2	8
GKP (SIDHARTHANAGAR)				3	3	2	8
	0	0	0	39	39	26	104
TOTAL TRAINEES/COURSE	20	2	2	76	83	59	242

5.6. Cost-estimate in Rs

1. Hardware requirements		No. of units	Total Costs
PC-AT	40 MB Hard disk, 1 MB RAM	21	2,115,000
Matrix Printer	132 Col., 264 Cps	21	840,000
UPS	625 AVR	21	570,000
Voltage Stabiliser	750 VA	21	185,000
Airconditioner	1700 VA	13	470,000
Generator set	2350 VA	13	370,000
Total Hardware (1.)			4,550,000
2. Training provision		No. of trainees	Total Costs
2.a. Off-the-job training			
Management training MIS		20	20,000
System analysis training		2	15,000
Programmers training		2	15,000
Introductory computer course		76	300,000
Application software I		83	210,000
Application software II		59	190,000
Sub-total 2.a.		242	750,000
2.b. On-the-job training			
Sub-total 2.b.		83	100,000
Total Training (2.a. and 2.b.)			850,000
3. MIS development			Total Costs
Information needs assessment			200,000
Rationalising reporting formats			200,000
System design			200,000
Software design & development & testing			2,000,000
Site preparation			700,000
System operations			800,000
System maintenance & data-processing support			800,000
Total MIS development (3.)			4,900,000
4. Joint Monitoring and Evaluation		No. of missions	Total Costs
Pilot Project Joint Monitoring		3	1,500,000
Pilot Project Evaluation		1	500,000
Total Monitoring and Evaluation (4.)			2,000,000
5. Contingencies			
5 % contingencies			610,000
Total Costs (1., 2., 3. 4. and 5.)			12,910,000

APPENDICES

APPENDIX 1. TERMS OF REFERENCE

1. To make proposals for a MIS Pilot Project to support Jal Nigam, based on:
 - an inventory of the information and management needs of the Jal Nigam management;
 - an inventory of existing databases and data-processing systems, on which a MIS should be based;
 - a comparison of monitoring and performance indicators developed by PSU, BHU and Jal Nigam. To assess if and how existing monitoring instruments can be integrated and standardised. If this is not possible, e.g. in the case of community participation indicators, to assess if and how the use of these indicators can contribute to solve the information needs of the RNE's Water Coordinator;
 - a selection of suitable information technology (both hardware and software). N.B. this issue, at times, tends to be over-stressed at the expense of information collection and processing;
 - a phased or modular approach, where support will be given to partial system development and further assistance will become dependant of the actual use and effectiveness of the MIS.
2. In preparing these proposals to take into account:
 - the supporting activities of the World Bank, UNICEF and the Technology Mission to Uttar Pradesh on MIS (esp. system and software development), so that any support from the Indo-Dutch Programme will be complementary to these activities;
 - the suggestions on computerization and MIS introduction for Sub-Project VII, which could be selected for the MIS Pilot Project;
 - the recent suggestions made by the IRC as to the establishment of a MIS for the RNE's Water Coordinator.
3. In preparing these proposals pay special attention to:
 - the assessment of training needs of field-staff, responsible for systematic data-collection and subsequent regular submittance of relevant information;
 - the assessment of training needs of middle and higher level staff, being the information processors and users of information flows for strategic decision taking within Jal Nigam. These staff also provides information to external agencies, e.g. donor agencies and government.
 - N.B. Training needs assessment will have to include: expressed need to get better data and a regular flow of high quality information, capacity to check the correctness of information for decision taking processes, and willingness to discuss the so-called "fixed-norm" approach.
4. The Consultant will prepare a report of this first mission within one month after return from India. The report will contain a Plan of Operations for a follow-up of this consultancy assignment, including a financial plan and time schedule for implementation, on which all parties shall agree during the mission.
5. A PSU social scientist will act as a guide and facilitator to the consultant during the mission.

Appendices

APPENDIX 2. ITINERARY OF MIS MISSION UP-26

Day	Date	Programme	Activity
Monday	22 April	Departure from Amsterdam by HV 607 to London Gatwick by BA 035 to Delhi	
Tuesday	23 April	Morning: Arrival at Delhi Afternoon: Briefing session with the WACO at RNE	RSM
Wednesday	24 April	Morning: Discussions with Water Mission Afternoon: Discussions with Danida, UNICEF and NIDC	RSM RSM MIS
Thursday	25 April	Morning: Transfer to Lucknow by IC 409 Afternoon: Discussions with PSU	RSM RSM
Friday	26 April	Morning: Discussions with PSU and Jal Nigam Afternoon: Discussions with Jal Nigam and Dep.of Urban Development	RSM RSM
Saturday	27 April	Morning and Afternoon: Discussions with Jal Nigam and PSU on Institution Development and MIS	MIS
Sunday	28 April	No Programme	
Monday	29 April	Morning: Discussions with JN Monitoring Committee for Computerization Afternoon: Discussions with EDP-Cell and on maintenance system for piped water supply schemes (Sub-projects I, IA, IV and VII)	MIS MIS RSM

Appendices

Day	Date	Programme	Activity
Tuesday	30 April	Morning: Study on reporting formats for piped and hand pump water supply and sanitation	MIS
		Afternoon: Discussions on revised Sub-project submissions and Sub-project V	RSM
Wednesday	1 May	Morning/Afternoon: Discussions on reporting formats and MIS for Materials and Accounts	MIS
		Afternoon: Discussions with UPTRON on soft-ware development and training	MIS
Thursday	2 May	Morning: Discussions with JN Chairman	RSM
		Afternoon: Discussions on manuals and maintenance systems for hand pumps	RSM
		Discussions with JN Training Centre	MIS
Friday	3 May	Morning: Meetings with EDP-cell	MIS
		Afternoon: Discussions on reporting formats and MIS for Works	MIS
Saturday	4 May	Morning/Afternoon: Discussions on reporting formats and MIS for Works	MIS
Sunday	5 May	No Programme Evening: Transfer to Delhi by IC 436	
Monday	6 May	Morning: Discussions with RNE on progress and with NIDC on MIS introduction and assistance to UP Jal Nigam	MIS
		Afternoon: Discussions with UNICEF on MIS and assistance to Jal Nigam	MIS
		Evening: Transfer to Lucknow by IC 435	

Appendices

Day	Date	Programme	Activity
Tuesday	7 May	Morning: Discussions with UNICEF Regional Office at Lucknow on MIS assistance to Jal Nigam Afternoon: Drafting of conclusions and recommendations	MIS
Wednesday	8 May	Morning: Drafting of conclusions and recommendations Afternoon: Presentation of conclusions and recommendations to Jal Nigam - Computerization Monitoring Committee Evening: Opening PSU field office in Sanjay Nagar and Magic show on development communication at Jalalpur	RSM MIS RSM
Thursday	9 May	Morning: Presentation of draft conclusions and recommendations to Jal Nigam Afternoon: Presentation of final conclusions and recommendations to Dep.of Urban Development Evening: Transfer to Delhi by IC 436	RSM RSM
Friday	10 May	Morning: Discussions with World Bank on Rural Water Supply Projects (incl.MIS) Debriefing to WACO at RNE Afternoon: Discussions with NIDC on MIS introduction at UP Jal Nigam Debriefing to Water Mission	RSM RSM MIS RSM
Saturday	11 May	Transfer to Amsterdam by KL 836	

Appendices

APPENDIX 3. LIST OF PERSONS MET

NEW DELHI

Royal Netherlands Embassy

Mr. P.M. Flik Water Coordinator

Ministry of Agriculture and Rural Development, National Drinking Water Mission

Mr. A.N. Asthana Director Water Mission

Mr. Samir Mathur Under Secretary Development Department

Mr. A.K. Gosh Assistant Adviser, Rural Development Department

UNICEF

Dr. P. Kumar Project Officer Monitoring and Evaluation

Mr. Y.D. Mathur Sanitation Coordinator

Mr. M. Akhter Chief Water & Environmental Sanitation

Mr. S. Huda Project Officer Sanitation

Mr. B.B. Samanta Project Officer

Danida

Mr. B.K. Hansen Head Water Section

UNDP/World Bank

Mr. T.K. Skytta Manager Water and Sanitation Programme

Mr. R.A. Boydell Senior Sanitary Engineer Water and Sanitation Programme

Mr. D. Davies HRD Specialist Water and Sanitation Programme

Mr. J. Bjerre Sector Planner Water and Sanitation Programme

Mr. V.R. Iyer Consultant Water and Sanitation Programme

Mr. P.C. Mohan Consultant Water and Sanitation Programme

National Industrial Development Corporation

Mr. V. Manchanda Chief Manager Computer Services Division

Mr. Y.B. Lall Chief Manager Computer Services Division

Mr. B.S. Chawla Senior Manager Computer Services Division

Mr. S. Dharwadkar Adviser Computer Services Division

UTTAR PRADESH

Programme Support Unit

Dr. Jatin Dé Director/Social Planning Adviser

Dr. Y. Kumar Coordinator, Community Participation

Ms. P. Nair Coordinator, Training and Documentation

UPTRON India Limited

Mr. A. Singhal Senior Manager Computer Consultancy & Services

Mr. B.K.P. Saha Software Manager Computer Consultancy & Services

Appendices

Department of Urban Development

Mr. Umashankar Special Secretary
Mr. S. Singh Coordinator Bilateral Programme

Uttar Pradesh Jal Nigam

Mr. B. Sahay Chairman
Er. Darshan Singh Secretary Management
Er. Y.N.Chaturvedi Manager Monitoring
Er. C.S. Jain Deputy Manager Monitoring
Er. R.N. Goel Materials Manager
Mr. Hamid Mustafa Senior Accounts Officer (Loan)
Er. M.A. Khan System Analyst EDP Cell
Er. M.K. Gupta System Analyst EDP Cell
Mr. R. Vura Programmer EDP Cell
Mr. S.H. Kazmi Programmer EDP Cell
Er. Gyan Sagar Manager Training
Er. G.M. Mehrotra Deputy Manager Training
Er. P.C. Govil Executive Engineer & Deputy Secretary (P-2)

UNICEF

Mr. B.B. Samanta Project Officer

Other

Dr. B.D. Pathak Ground Water Specialist