

CHAPTER 3: INSTITUTIONAL ASPECTS AND CAPACITY BUILDING

3.1 INTRODUCTION

With the increased awareness towards improved living environment, development of sewerage and sanitation infrastructure has been accelerating in the last few decades. Even after establishment of sewerage (conventional and decentralized) and onsite facilities, if the system is not operated, maintained or managed properly, it may fail to provide the desired level of services on a sustainable basis. An efficient organization is very important for planning, design, and sustainable operation and maintenance of sewerage systems. Therefore, measures must be taken for institutional strengthening and internal capacity building so that the efforts made can be sustained over a period of time and the system put in place can be well managed. Institutional strengthening can be done by adequately decentralizing the administration, delegating adequate powers at the decentralized level, inducting professionals into the administration and providing adequate training to the existing staff. This chapter considers aspects of management of sewerage and onsite systems and describes in detail about strengthening the capacity of relevant staff-members through training.

3.2 ORGANIZATION SETUP

Sewerage services have been historically under the control of public health engineering departments governing the entire State for capital works and local bodies like corporations, municipalities, town/gram panchayats for O&M. In recent decades, separate Boards/Nigams have been created in major cities like Bangalore, Hyderabad, Chennai and Lucknow for both capital works and O&M.

In a large country like India, the sewerage management can be performed effectively if administration is adequately decentralised. Decentralisation can be at the City level, the Zonal level, and the Ward level. Sewerage services would get focussed attention if all functions of the city administration are decentralised at Zone/Division levels and senior officers are placed in-charge of each Zone/Division functioning independently with adequately delegated powers. The 74th Constitutional Amendment envisages formation of Ward Committees in each city that has a population of above 3,00,000. These Ward Committees, as and when formed, may be very usefully involved in the Ward level.

3.2.1 Central Government

The role of the Central Government is to administer uniformity in the features by bringing out manuals and advisories and disbursing grant funds under various Central Government Programmes.

Broad policies on sector development of water supply and sanitation in urban and rural areas are formulated and circulated to State Governments and Union Territories as guidelines. Technical manuals are drafted and published for use by the water and sewage authorities. The progress in providing these services in the urban and rural areas are monitored. External aid is also procured through the GOI for major projects fulfilling certain norms. Apart from offering specific in-service training programmes for the employees of sewerage authorities in the States, financial assistance for specific in-service training programmes of the States are also offered to some extent. Assistance from financial institutions and other bodies like HUDCO, LIC, etc., are also available.

3.2.2 State Government

The State Governments offer to assist the local bodies in planning and implementation of sewage collection, treatment and proper disposal schemes of individual or a group of local bodies. Financial support is also given for these schemes in the form of grant-in-aid and loan, etc., for capital investment. In special circumstances, the State Governments assist the local bodies in operating and maintaining their sewerage schemes through their own departments or through statutory boards. Trained engineers and skilled workers are sometimes deputed to local bodies on request, to plan, implement and operate and maintain the systems. The State Governments monitor general progress of schemes of local bodies in respect of planning, implementation and O&M.

3.2.3 Parastatal Agency

These Agencies/Boards are devices by which State Government would be able to establish corporate public entities to construct manage and operate water and sanitary services on a fully commercial basis in large metropolitan areas as well as in smaller urban communities. These Agencies/Boards should be empowered and equipped to raise such capital from local resources and open market borrowings to supplement the resources provided by the Government at the State and Central level. Such Agencies/Boards may have the advantages of:

- a. increased efficiency resulting from financial autonomy
- b. improved ability to raise capital with confidence
- c. affording better opportunities for small municipalities grouped together to finance and operate their schemes as a business proposition
- d. economies implicit in a common authority which may be made to serve several undertakings
- e. a better and fuller realization of taxes/cess when this duty is segregated from local politics
- f. the economies possible by pooling technical and administrative staff to serve a number of municipalities by rotation or time share.
- g. Opportunities for equalizing the rates in every region

A statutory Water and Sanitation Board may be set up at the State level with regional boards to the extent necessary within the State,

- a. to provide water and sanitation services and to collect revenues to meet such services,
- b. to raise the capital needed to provide the facilities and to exercise all other corporate powers necessary to act on behalf of the local bodies within their jurisdiction. Normally, such boards would encompass all activities including production, conveyance and distribution of water within their statutory areas and the collection, treatment and disposal of sewage from that area as well as other sanitation services. It is, however, possible that some local bodies may prefer to purchase water in bulk from the statutory boards and arrange for the internal distribution themselves and may prefer to have the statutory board take over sewage in bulk from the local area and arrange for its treatment and disposal.

This should be avoided as far as possible as the supply and distribution of water as also collection and disposal of sewage are two interdependent functions and the divisions of such functions amongst two independent agencies might lead to inefficiency and unavoidable difficulties for both parties. Any local body managing its systems satisfactorily need not necessarily come under such a Board.

3.2.4 Urban Local Bodies

It is obligatory for every local body (Municipal corporation, Municipality, Nagar Panchayat, etc.) to collect, transport and properly dispose of sewage produced in the area under their respective jurisdictions. Depending upon the financial status of each local body, the State/Central Governments come to the help of these local bodies to meet a part/whole of their capital investment cost on schemes in the form of grant-in-aid and/or loan. The expenditures on annual O&M of these schemes however, have to be met by the ULB out of its own revenue generated from taxes. As per the respective acts, local bodies have been empowered to levy and recover tax from the habitation to whom sewerage service is provided by the local bodies.

3.2.4.1 Types of Urban Local Bodies

According to the Article 243 of 74th Constitutional Amendment Act (CA), the ULBs have been classified into the following three categories:

- a. Municipal Corporation (Nagar Nigam) - for larger urban areas
- b. Municipal Council or Municipality (Nagar Palika) - for smaller urban areas
- c. City Council (Nagar Panchayat) - for transitional areas

No quantitative dimension for area or population has been specified for their identification. However, the 74th CA lists five criteria for constituting the ULBs: Population, density, revenue generated per annum, percentage of employment in non-agricultural activities and economic importance of the local body. In addition, several states have specified their own criteria for the purpose with the state legislatures setting up the criteria while amending their Acts.

The area under a Municipal corporation is further divided into wards. Individual wards or collections of wards within a corporation sometimes have their own administrative body known as ward committees. Municipalities are also divided into wards, which may be grouped together into ward councils. One or more representatives are elected to represent each ward.

3.3 NEED FOR CAPACITY BUILDING

Proper sewage collection and treatment forms a sound basis for improvement in community health. Maximum health benefits will be achieved only when the sewerage and sanitation facilities operate continuously and to full capacity in conformity with the acceptable standards of quantity and quality. If the sewerage tasks are to be carried out effectively and efficiently, capabilities should be strengthened as under:

- a. Institutional capacity building
- b. Human resources capacity building by training

Also, many ULBs in the country do not have adequate Environmental Engineers/Public Health Engineers and other professionals for planning, design of sewerage systems, implementation and O&M. It is, therefore, necessary to induct such expertise by either in-house or from a central pool under the State depending on the needs of different classes of towns. Sample job requirements are described in Section 3.14 of this manual.

3.3.1 Institutional Capacity Building

Funds may be available in a given institution such as a municipality, but the institution by itself may not be able to discover within itself a way of rendering the services more efficiently and profitably without unnecessarily levying impractical tariff on users. This requires:

- a. the ability of a dedicated municipal information unit in the country to collect, collate and analyse comparable data on municipal services and finances on an annual basis from across the country and bring out a concise set of successful models and
- b. developing a performance assessment system for evaluating and recognizing the institutions which perform the best so as to confer a recognition on a rotational three yearly basis in various categories of corporations, municipalities, townships, panchayats and parastatals.

3.3.2 Human Resources Capacity Building

Here also, funds may be available in a given institution as a municipality, but there may not be persons who have innovative thoughts, the ability to envision newer project deliveries, to enhance revenue collection, etc. Further, there must be a guarantee that once an officer has initiated a newer line of deliverables, the officer should be allowed to continue for a reasonable period. At the same time, the officer needs training and visits to other such agencies to see and learn how others are doing these. This can be implemented by a continual training.

The Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) was formed by members from the water and sewerage services from the various agencies in the area. A programme was instituted whereby a set of training courses were designed and an in-house training centre was constructed and for the first few years it was ensured that at a given time, 10% of the staff would be on training, if necessary by repeat training also.

The details of the CMWSSB training centre are given in Appendix C 3.1. The stability of this agency, even today after 34 years, is largely due to this initial orientation of the staff. The training goes on even today, but not as intensively as in the initial stage.

The training imparted to the operators should always be given only in actual working plants and not in classrooms. Hence, the operators have to qualify in their works at the plant only. It is necessary to regionalize such training centres instead of creating too many such centres all over the country,

3.3.3 Inadequate Fund Allocation for Capacity Building

Capacity building for both the institutions and human resources is a continual task and not a one-time affair. Therefore, a portion of the budget is to be set aside for these. The High Powered Expert Committee set up for estimating the Investment Requirements for Urban Infrastructure Services for the period 2012–2031 has given a forecast as in Figure 3.1 (overleaf) and identifies a separate head of expenditure for capacity building. It may be seen that the funds needed would be about Rs. 1,01,759 crores.

3.4 TRAINING NEEDS ASSESSMENT

Training is a planned process to modify the attitude, knowledge or skill through learning experience to achieve effective performance in activity and to develop abilities of the individuals to satisfy the current and future needs of the organization.

The personnel who are already available or chosen to carry out the actions contained in the O&M programme may have to be trained through special courses or by “on the job training” to ensure that these personnel are thoroughly trained to carry out the actions listed in the plan of maintenance. This training is essential to prevent experimentation by operating personnel with equipment since often these operating personnel may not have the capability to take up the required maintenance. On the job training is preferred to classroom training. The supervisors can be trained initially; and later they can train the operators.

3.4.1 A systematic plan of action of any training programme includes:

- a. Identification and assessment of the need for planned training
- b. Defined training objectives
- c. Appropriate strategy for training
- d. Provision for assessing effectiveness of training

3.4.2 Objective of training needs identification:

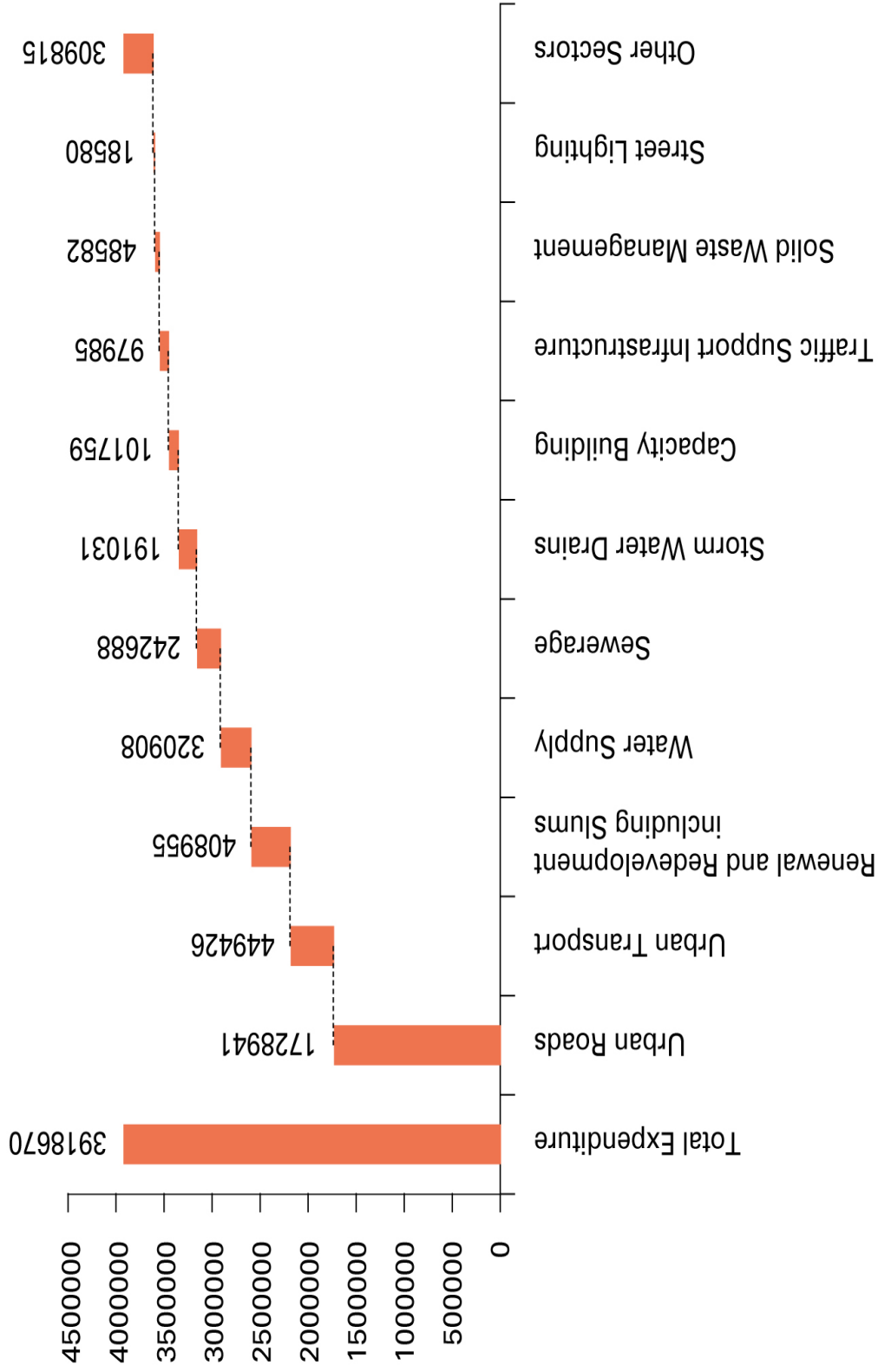
- a. To identify a profile of the training needs and interests of the employees
- b. To gather information on the climate, culture and communication links of the work place
- c. To make recommendations for a training initiative that would be the basis for a strategic plan for employee development

3.4.3 Process of identification of training needs

This involves the following steps:

- a. Determine what is required or expected in the job
- b. Determine the degree to which this requirement is being met
- c. Determine whether training can bridge the gap between what is required in the job and the present knowledge, skills, attitudes or behaviour of the employees

**Urban Infrastructure Investment Requirement: 2012-31
(Rs crore)**



Source: HPEC, MoUD, 2011

Figure 3.1 Urban Infrastructure Investment Requirement 2012-31

3.4.4 Data collection on training needs

Data on the assessment of training needs can be collected in the following ways:

- a. Discussions with officials and employees, supervisors and top management
- b. Observing the employees, their work, work flow and relationships
- c. Review of records and reports, particularly the reports, if any, which provide the reaction of the consumers to the services provided by the utility, organization structure, organization policies, records of past trainings, etc.

3.4.5 Analysis of data

The analysis of the data is carried out with a view to make the assessment of training needs for various levels as below:

- a. Needs for the organization as a whole – corporate needs
- b. Needs for departments/teams within the organization – group needs
- c. Needs for individual employees – individual needs

There is a need for i) job analysis and ii) individual analysis for carrying out a training need analysis.

3.4.6 Job analysis

Information is obtained on the following aspects:

- a. Problems faced by job holders in learning basic skills and applying them successfully in work
- b. Weakness in performance of existing job holders due to gap in knowledge, lack of skills or motivation
- c. Areas where competence levels are not up to required standards
- d. Areas where future changes in work process or methods or job responsibilities indicate training needs
- e. How training is carried out at present

A job analysis worksheet is shown in Table 3.1.

Table 3.1 Job Analysis Worksheet

What is to be done?	Why?	How?	How well?
To	In order to	With whom? Where? Process or procedure? What equipment or facilities	Quantity? Output required? Results needed? Quality?

Source: CPHEEO, 2005

3.4.7 Individual analysis

Information obtained from individual analysis includes:

- a. Details of job holders with adequate knowledge and skill for the job
- b. Effectiveness of a person in putting her/his work to practice
- c. Behavioural changes and work efficiency of job holders after attending training programme
- d. Level of job satisfaction

An illustrative individual analysis worksheet is shown in Table 3.2

Table 3.2 Individual Analysis Worksheet

Individual particulars	Detailed information		
	Essential	Useful	Not necessary
Educational/Training/Experience			
Sex, Age			
Occupation			
Affiliation/Special Interests/Aptitudes			
Languages			
Attitudes, beliefs			
Knowledge of subject			
Authority			

Source: CPHEEO, 2005

3.4.8 Results of the training needs analysis

From the training need analysis described above; the present knowledge and skill of job holders of the organization can be arrived at. The results of the training needs are shown in Table 3.3.

Table 3.3 Results of Training Needs

Job requirement	Trainee's current knowledge & skills				
	Excellent	Good	Fair	Poor	Nil
1.					
2.					
3.					
4.					
Etc.					

Source: CPHEEO, 2005

The training needs are identified from the above information. Considering the identified training needs as indicators, training objectives can be listed out to arrange the training.

3.4.9 Short-Term Training Needs

Short-term training needs for the existing staff of the organization are likely to be met by short courses or other similar interventions as.

- a. Specific training needs identified can be met by appropriate short-term training programmes.
- b. This improves competence of employees.

Proper job analysis and training analysis can identify short-term training needs. Short-term training needs can mostly be attended by means of in-house training programmes.

3.4.10 Long-Term Training Needs

Long-term training needs should largely be addressed by deputing staff to undergo formal educational programmes in sewerage and sanitation (regular/distance learning), as well as specifying recruitment criteria for new entrants.

Universities, Technical Colleges, Public/Private Sector institutes offer formal programmes leading to certification or degree/diploma in sewerage works.

- a. Evaluations of short-term training programmes should lead to assessment of long-term training needs.
- b. Existing staff of organization can undergo formal programmes by distant learning.
- c. Long-term training needs addresses the future demands of the organization.

3.4.11 Managerial Training Needs

The managers of sewerage work deal with planning, organization and finance in sewerage works. They should also be required to formulate programmes and implement activities aimed at improving the effectiveness of O&M practices. Sewerage works need appropriate strategy for decision-making based on information, engineering and management. Appropriate strategy influences the efficiency of management.

The staff should know the procedures for routine tasks to be performed by them and supervision and inspection managers should know the checks and inspections to be carried out by them at specified intervals to monitor and evaluate the status of activities. The supervisors or inspection officers have to ensure that the O&M staff perform their assigned duties promptly and properly.

It is necessary to understand analysis methods for organizational state and cutting-edge management systems by training.

- a. Cutting-edge management system – Asset Management, Management Information System, management by Public Private Participation (PPP), Project Management, Disaster Management, New tender system, etc.
- b. Enhancement of Capacity for manager – Problem–solution training, Leadership training, Communication training.

3.4.12 Technical Training Needs

Sewerage works need many fields of technology – civil engineering, architecture, mechanical engineering, electrical engineering and chemistry. Each technology interacts with others, so basic knowledge of technology is essential for employees. Sewerage technology evolves very rapidly.

There are many dangerous equipment and chemicals involved. Integration of these technologies makes sewerage systems work well. In order to enhance the capacity, periodical training is essential in the following spheres;

- a. New employees – Basic knowledge of sewage treatment, technical issues in day-to-day O&M
- b. New technology – Sewer renewal, sewer cleaning equipment, advanced treatment
- c. Safety measures – Hydrogen sulphide, lack of oxygen, chlorine, electricity, etc.

3.5 TRAINING FOR ENHANCEMENT / REFRESHING SKILLS

The purpose of any training programme is to provide individuals with skills necessary for them to perform their assigned duties effectively and efficiently.

It has to be decided as to whether training to enhance the skills or training to refreshing the skills is to be arranged after ascertaining the skills of the job holders.

- a. Employee creative model:

Organizations provide training for enhancement of skills to encourage personal advancement.

- b. Organizational strategy model:

Basic skills are identified as a critical component in achieving corporate goals for refreshing the skills of work for increasing production and efficiency.

- c. Problem centered model:

The need for basic skills training is identified as a specific issue or difficulty faced by the concerned organization.

3.6 TRAINING OF TRAINERS

Training of trainers plays a key role in how effectively a trainer can operate to satisfy the needs of the trainees. This is a specific programme set out to enable new trainers to learn the basic techniques and approaches of training or to enable existing trainers to develop the training skills they already possess. Some of the specific objectives of this programme in sewerage sector are:

- a. To explain the necessity and objectives of training in sewerage works, O&M
- b. To practice participatory learning activities
- c. To carry out systematic training needs identification or training needs assessment
- d. To demonstrate appropriate technology for urban sewerage
- e. To prepare and review curriculum for various categories of trainees
- f. To select and use appropriate audio visual aids in training programmes

With new or improved skills of trainers, the trainers can arrange training programmes to enable other trainees to develop skills, knowledge and attitudes.

An example of a document for Trainer's Guide & Trainers Textbook for Training Programme on O&M of Sewage Treatment Plants has been developed by the Tamil Nadu Pollution Control Board (TNPCB) and DANIDA and is specifically made for the type and facilities affordable for Indian conditions. There is also a similar set of a 3 volume publication by Canadian Ontario Water Resources Commission, specifically meant for sewage works operators and published as early as 1969 (Ontario Water Resources Commission, 1968 and 1969). Similar publications in not only English but also in regional languages are needed so that the operators can really understand their roles easily and increase their confidence.

Example of specific training curriculum for employees is given in Section 3.15.

The need for training is to be decided in terms of the scope and the level. This can be for corporations, municipalities, jal nigams and parastatals. The competent authority to identify all these is the respective state governments. They will identify the prospective trainers, the topics and the levels of training. The CPHEEO may assist in identifying the appropriate institutes (national / international) for imparting training to the trainers (master trainers).

The master trainer will in turn impart training on various aspects of sewerage and sewage treatment systems. Adequate budget provision shall be made by state governments / ULBs / municipalities for imparting training on regular basis. The personnel who have undergone training should be deployed appropriately after the training in the long-term interest and foresight of the organization. Such training shall also be extended to people in O&M sector and employed by outsourced agencies and within the policies of the ULB.

3.7 ON-THE-JOB TRAINING

Depending on the place or location where training takes place, training can be called on-the-job training if the trainee gets training while working on the assigned job.

The trainee in the physical and social environment of the work place is simultaneously involved in the process of acquiring knowledge.

- a. The trainee requires little specialized attention in terms of extra equipment and manpower.
- b. It helps to develop and practice specific managerial/technical/administrative skills needed in O&M of sewerage works.
- c. The trainee works, learns and develops expertise at the same time and concepts and theories are put into practice immediately.
- d. Gives guidance to supervisors and instructs new employees in performing their tasks.
- e. It is considered to be an acceptable means to train officials in new developments and new systems when they are introduced.

For example, a mechanic / plumber may be given field experience in pump houses and small sewerage works schemes to operate and maintain them. This helps in:

- a. Skill Development: Learns how to do it
- b. Practical knowledge: Learns when to do it
- c. Education: Learns what to do
- d. Hands-on experience: Knows the impact

3.8 QUANTIFICATION OF TRAINING

Training programmes can be quantified in terms of category of staff being trained, the number of staff members who can be accommodated in a training programme, how often this training has to be given (frequency) and the duration of each course.

3.8.1 Category of trainees

- a. Executive officers
- b. Supervisory staff
- c. Administration and establishment staff
- d. Operators
- e. Training for grassroots level personnel

3.8.2 Category of the training course

- a. Technical / Public Health Engineering
- b. General Management
- c. Finance
- d. Operation and Maintenance
- e. Industrial / Personal Relations
- f. Computer Applications/IT

3.8.3 Number, Frequency and Duration

The key components are the number of trainees in a particular training course, how frequently that course is offered and duration of the course .

3.9 INCENTIVES FOR EFFICIENT PERFORMANCE

There is a need to provide for incentives and awards to recognize and encourage those employees whose performance has been found to be exceptionally efficient. This should enthruse other employees also to strive to improve their work efficiency. The HRD budget should provide for the incentives and awards.

3.10 TRAINING SCHEDULE AND YEARLY PROGRAMME

The change from a crisis type of O&M to a planned O&M can be undertaken gradually or in a relatively short period depending on the resources available. The change should be planned and coordinated with a training schedule. The training schedule should ensure that each staff member gets training periodically and training should be made mandatory for all the staff members of the utility.

A tentative action plan for the year can be prepared in advance. Every staff member should get training periodically and it should be made mandatory. This action plan would give the yearly programme of various training courses and it will include the following:

- a. Course group, title
- b. Category and number of participants
- c. Duration (including date on which training is to be held)

3.11 TRAINING INSTITUTIONS

External training facilities for a substantial proportion of the staff and personnel engaged in design and Research & Development (R&D) of sewerage facilities are available at both the national and local levels. Such training facilities are being used by many of the sewerage authorities.

Off-the-job training can take place in institutions outside the organization, which are specially equipped and staffed for training.

- a. It is the best way to acquire knowledge on advanced or latest office procedures, planning and monitoring, project implementations methods, quality assurance methods and proper maintenance of schemes.
- b. Use of systematic training techniques, special equipment and trained trainers.
- c. Basic skills and knowledge can be acquired quickly and often economically.
- d. Training courses cover standard theory and practice, which are easily translated from general to particular.
- e. Useful to implant highly specialized knowledge and advanced skills.

3.11.1 National Education/Training Facilities

3.11.1.1 Post Graduate Courses in Public Health/Environmental Engineering

The GOI has from time to time launched various programmes for increasing the provision of sewerage and sanitation facilities. The infrastructure, which is being developed by various ULBs/State Departments for drinking water supply, sewerage, sanitation, drainage, solid waste management, etc., will need more qualified and trained manpower for better designing and speedy implementation of all the schemes in an economical manner and also for proper O&M of old and new projects and infrastructure development.

In order to achieve these, the CPHEEO organizes several training programmes. The PHE training programmes are being sponsored by the Ministry since 1956 with the objective of providing training to in-service engineers and para-engineering staff of the various State PHED, Water Supply and Sewerage Boards, ULBs, etc.

Some of the institutions offering these training programmes are:

- i. All India Institute of Hygiene and Public Health, Kolkata
- ii. Veermata Jeejabai Technological Institute, Mumbai
- iii. Anna University, Chennai
- iv. Visvesvaraya National Institute of Technology, Nagpur
- v. Motilal Nehru National Institute of Technology, Allahabad
- vi. Shri Jayachamarajendra College of Engineering, Mysore
- vii. Shri Govindram Seksaria Institute of Technology & Science, Indore
- viii. Indian Institute of Technology Bombay, Maharashtra
- ix. Malviya National Institute of Technology, Jaipur
- x. Indian Institute of Technology Kharagpur, West Bengal
- xi. Indian Institute of Technology Delhi, New Delhi
- xii. Jawaharlal Nehru Technological University, Hyderabad

The duration of the Post-Graduate course is 24 months.

3.11.1.2 Management Education at Degree/Diploma Level

Management Courses are offered inter-alia, at the following management Institutes:

- i. Indian Institute of Management, Ahmedabad
- ii. Indian Institute of Management, Bangalore
- iii. Indian Institute of Management, Kolkata
- iv. Indian Institute of Foreign Trade, New Delhi
- v. International Management Institute, Delhi
- vi. Administrative Staff College of India, Hyderabad
- vii. IIM, Tiruchirapalli

3.11.1.3 National Institute for Training in Industrial Engineering (NITIE)

Short-term non-residential and residential courses are held by the National Institute for Training in Industrial Engineering (NITIE). The courses are from five days to two weeks' duration and are held at five centres. Courses held in Mumbai are residential. Courses held in Bangalore, Delhi, Hyderabad and Madras are non-residential.

3.11.1.4 Refresher Courses Conducted by CPHEEO

Refresher Courses are conducted by various recognized institutes under the sponsorship of the CPHEEO, by the Ministry of Urban Development under the Public Health Engineering Training Programme. The courses being offered are given in Appendix C 3.2.

3.11.1.5 National Environmental Engineering Research Institute (NEERI), Nagpur

NEERI is a research institute primarily engaged in R&D work in the field of public health and environmental engineering. Training and consultancy services are offered by this institute in the following areas

- i. Water Treatment and Supply
- ii. Sewage Treatment and Disposal
- iii. Industrial Waste Treatment
- iv. Stream Sanitation
- v. Industrial Hygiene and Air Pollution
- vi. Rural Sanitation

3.11.1.6 Training in Outside Institution (International Training Network)

There exist a number of institutions coming under an International Training Network (ITN) established for the implementation of HRD activities. In India, the following institutions are in the network:

- i. All India Institute of Hygiene & Public Health, Kolkata (ITN Centre)
- ii. Gujarat Jalseva Training Institute, Gandhinagar
- iii. Environmental Sanitation Institute, Ahmedabad
- iv. S.J. College of Engineering, Mysore
- v. Gandhigram Rural Institute, Gandhigram
- vi. Institute of Engineering & Rural Technology, Allahabad
- vii. Motilal Nehru National Institute of Technology, Allahabad

The list provided is not exhaustive and the state governments are also conducting various training programmes depending on their needs.

3.12 CAREER ADVANCEMENT

An important question is: how does an employee benefit even after being well trained and having proven one's application to duty? In the present system, the employee will merely receive a promotion, which is entirely by seniority and may receive a good remark in the performance appraisal note. This unfortunately does not serve to encourage staff members. There are cases where an entry-level engineer remains in the same level for decades. Similarly, sewage works operators remain and retire as sewage works operators.

However, people who have had the opportunity to enter the All India Civil Services, rise rapidly in stature and salaries and by the time a sewage works operator retires in her/his initial cadre, these officers become heads of Government services. These anomalies do not enthuse the staff in O&M and should be corrected. Within the framework of administrative machinery, the incentives below should be considered and promoted.

3.12.1 Higher Professional Qualifications

For the O&M staff members who possess a basic qualification such as diploma, there is an opportunity to appear for examinations of the Institution of Engineers, India, and qualify to receive a certification as an associate member, which is recognized as equal to a degree in engineering. Similarly, there are opportunities whereby the staff can pursue such qualifications from local universities through part-time courses. However, the issue is there are no such avenues for the sewage works operators who are the core staff members of the sewerage system in the field, but who may not have the money or time to sit and study. It is strongly recommended that a set of grades be introduced for the operators and the staffing for various sized plants should be compulsorily manned by these categories of operators, naturally with higher pay scales for the higher categories. A recommended simple structure is proposed in Table 3.4.

Table 3.4 Recommended Categories of Sewage Works Operators

Category	Basis of Offering the Grade
A	After 10 years of service in B
B	After 10 years of service in C
C	After 5 years of service in D
D	Entry level

A recommended compulsory staffing pattern for sewerage works is given in Table 3.5.

Table 3.5 Recommended Staffing for Sewerage

	Range and Volume of public water supply in MLD	Category (as in Table 3.4)			
		A	B	C	D
1	Up to 1				All shifts plus one
2	Between 1 and 5		General shift	All shifts plus one	All shifts plus one
3	Between 5 and 10	General shift	All shifts plus one	All shifts plus one	All shifts plus one
4	Above 10	All shifts plus one	All shifts plus one	All shifts plus one	All shifts plus one

Note :The number of each category in each range will depend on local geographic area of the concerned local agency. The category A, B, C and D are to be read inter-alia with Table 3.4.

It should be made compulsory for the local agency to have such staff in its employment roster in respective categories to qualify for receipt of grant funds under various Central Programmes.

3.13 NEEDS FOR TRAINING BUDGET

It is preferable to have a separate budget for HRD for each utility. While preparing budget for training, one should plan and budget for the following items:

- a. Professional/registration fee
- b. Honorarium and travel expenses for the trainer/faculty
- c. Accommodation for trainer(s)
- d. Ground transportation for trainer(s)
- e. Training rooms
- f. Library facilities
- g. Audio-visual equipment (OHP, LCD, etc.)
- h. Snacks and tea (refreshment)
- i. Travel expenses for trainees for field visit
- j. Stationery articles
- k. Computer time, stationery, etc., for computer-aided training courses
- l. Incentives and awards for improvement in work efficiency

A typical worksheet for developing a training budget is given in Table 3.6 overleaf.

Budget for training is frequently expressed as a percentage of the total payroll.

On an average 2–2.5% is preferred, out of which 75% can be spent for in-house training and rest can be utilized for training in external institutions.

3.14 JOB REQUIREMENTS

3.14.1 Responsibility of Senior Management Personnel

- a. The senior management personnel should define the role of the agency and set out strategies for long-term objectives. They should be in close contact with other agencies involved in infrastructure services and work for coordination with government and private agencies in design, construction, O&M, monitoring and evaluation of the functioning of the agency.

Their responsibilities are to:

- i. Establish mechanisms and type and level of service for sewerage system (including centralized, decentralized, and onsite systems) for the population in their service area, determine priorities and define areas for expansion of coverage
- ii. Determine and administer staffing structure, service conditions, job descriptions, salary levels, performance standards, staff training and promotions

Table 3.6 Worksheet for Developing Training Budget

Questions to consider	Cost	Comments
Event fees:		
Is there a registration fee, course fee, or tuition fee for the event?		
Trainer or consultant fees		
What is the trainer's or consultant's hourly, daily, or weekly fee?		
Does the trainer or consultant charge for preparation time? If so, how much?		
Materials:		
Are there course materials associated with the training? How much do they cost? Does each trainee need a copy, or can they share?		
Will the training require printing or photocopying of materials? If so, how much will these services cost? Are they included in the trainer's fees?		
Will the trainer need audio or visual aids (such as overhead projector and slides, TV)? How much will it cost to purchase or rent these items?		
Are other assorted materials (such as name tags, paper, pens, files, computer stationary) reqd to be purchased? If so, what will they cost?		
How much will refreshments cost? How will you pay for them?		
Space:		
Where will you hold the training? What will the space renting cost?		
Will you provide on-site care? Are necessary spaces and resources available? What will this cost?		
Travel:		
Will the training require staff to travel? Will they need to stay over? How much will this cost, including mileage, per diem, and lodging?		
If the trainers are from out of town, what is the total of their travel, lodging, and per diem expenses? Are their travel costs covered separately or included in the contract?		
If volunteers are included in the learning event, will they incur transportation or parking expenses? Are they eligible for reimbursement?		
Staff Time/Substitutes:		
Do some employees involved in the training need to be replaced by substitute staff? How much will the substitutes cost?		
If follow-up training or assistance will be needed, what will this cost?		
Other:		
Accommodation for the out station trainees		

Source: CPHEEO, 2005

- iii. Ensure efficient use of funds and control construction and O&M costs
 - iv. Set targets for achieving excellence in quality, quantity, continuity, cost, and set tariff levels keeping in view the social equity and agency's need for financial self-sufficiency
 - v. Promote dissemination of information and seek support and acceptance of the agency's programmes and plans by public and private bodies
 - vi. Initiate actions for conservation of water environment
 - vii. Promote reuse of effluent and sewage sludge
 - viii. Consider use of gas produced in digester
 - ix. Carry out a situation analysis of technological capacity, government policies, and sources of funding which affect the O&M
 - x. Prepare an inventory of the installations and equipment
 - xi. Adopt appropriate technologies to minimise O&M costs
 - xii. Ensure quality control in the purchase and installation of materials and equipment and thus ensure prolonged useful life of materials and equipment through preventive maintenance
 - xiii. Raise the productivity of the workforce
 - xiv. Monitor plans for prevention and control of pollution
 - xv. Consolidate programmes formulated by middle and operational management levels and prepare a long term plan for O&M with targets set for each unit for the coverage, output, productivity and cost
- b. Determine the technical, economic and organisational feasibility of the O&M plan, make adjustments where necessary, and carry out cost-benefit analysis or undertake socio-economic studies or other studies if deemed necessary
 - c. Arrange for dissemination of O&M plan with other agencies, authorities and public
 - d. Approve the long term plan, prepare programmes for investment and implementation of long term plan for O&M, set targets for implementation of long term plan for O&M, allocate resources according to priorities, set targets, and monitor and re-allocate resources where necessary to ensure that the targets set in the plan are achieved
 - e. Encourage programmes of a strategic nature which have potential for R&D, and encourage adaptation of new technologies and approaches
 - f. Create enabling environment for adaptation by the agency for technical, regulatory and political changes
 - g. Prepare contingency plans for continued service delivery in emergency situations

3.14.2 Responsibility of Middle Management Personnel

- a. Middle management personnel should contribute in the formulation of a long-term plan for O&M and contribute in preparing projects for expanding and making the facilities work effectively. For achieving this they should:
 - i. update system data, select design criteria and decide how to meet the technical standards and social needs in the most cost effective way,
 - ii. formulate and implement programmes for increasing productivity,
 - iii. formulate and implement programmes for reuse of the effluent, sludge, and gas and provide data to senior management for formulation and implementation of pollution control programmes.
- b. Middle management personnel should be responsible for defining the type of service and coverage and formulate medium-term programmes for O&M. These programmes should aim at:
 - i. Expanding coverage of service
 - ii. Making best use of existing physical, financial and human resources
 - iii. Improving quality of services provided
 - iv. Rehabilitation (as part of preventive maintenance) of component parts of sewerage installations and equipment with a view to extend their useful life
 - v. Reducing costs and raising productivity in the agency's O&M programmes
 - vi. Supervising the O&M of sewerage system
 - vii. Monitoring environmental conditions
 - viii. Promoting awareness of and educating users about the proper use of sewerage services.
- c. Middle management personnel should determine the technical, economic and organisational feasibility of the O&M plan. They should determine priorities and set targets for implementation of long-term plan for O&M.
- d. Middle management personnel should consolidate all the short term O&M plans prepared by the operational management level and submit it to senior management to ensure that it is compatible with the long term plan. They should monitor and re-allocate resources where necessary to ensure that the targets set in the plan are achieved.

3.14.3 Responsibility of Operational Management Personnel

Operational management personnel are primarily responsible for short-term planning and participate in formulating medium-term and long-term O&M plans.

Operational management personnel have responsibilities in the planning, design and construction work as well as O&M of the agency's equipment.

They also propose medium-term activities to operate and maintain the sewerage system and participate with middle management personnel in defining objectives, strategies and resources both to extend and to ensure full use of the coverage of services.

They should also evaluate the feasibility of medium-term investments for O&M. In line with long-term and medium-term programmes for O&M, they should formulate short-term objectives, targets and programmes.

They should assess the resources required and allocate them, monitor and evaluate the performance in the following areas:

- i. Studies and designs needed for rehabilitation of the installations or for expansion of the services
- ii. Maintain the units under operation so that they work efficiently and last as long as possible
- iii. Measurement of sewage flow rates, water quality test for maintenance
- iv. Update the ledger data
- v. Processes for improvements of house connections and domestic plumbing
- vi. Processes for treatment and quality control of water

3.14.4 Job Description

Work details regarding O&M duties and designations are shown in Table 3.7 and Table 3.8.

The management of sewage works is headed by

a Chief Engineer (CE) or Superintending Engineer (SE) at the senior management level and supported by Executive Engineer (EE) or Assistant Executive Engineer (AEE) at the middle level and Assistant Engineer (AE) or Junior Engineer (JE) at the operational level depending on the plant size.

The engineers are assisted by chemists, electricians, mechanics and operators.

The chemist and the chemist's assistants collect sewage samples from influents and effluents at least once a day for assessing wastewater quality.

Table 3.7 Job Description

No	Duty	Description
1	Execution of general affairs related to sewage	General affairs, Personnel, Salary, Welfare, Dissemination
2	Budget Execution	a) Procurement of materials and administration (Fuel, Chemicals, consumables) b) Contract of construction c) Contract of outsourcing
3	Asset Management	Administration of fixed assets, maintenance and repair
4	Coordination of Service Charges	User survey, user charges, collection of user charges, survey of uncollected sewerage charges
5	Guidance for house connections	Check and inspection of house connections
6	Monitoring and guidance on industrial effluent	Check, inspection and guidance on pre-treatment facilities and effluent quality
7	O&M of sewers	a) Planning, preparing detail plans and supervising implementation of inspection and survey of sewers b) Planning, preparing detail plans and supervising implementation of cleaning and de-sludging of sewers c) Planning, preparing detail plans and supervising implementation of rehabilitation and replacement works d) Protection of sewers e) Approval and authorization of sewer related matters
8	O&M of pumping station, and treatment plant	1) Operation <ul style="list-style-type: none"> • Planning of sewage treatment and sludge treatment • Planning operation of facilities of pumping station & STP • O&M of pumping stations and STP • Disposal plan for grit, screenings, and sludge, Preparation of plan and implementation of transport and disposal • Planning and implementation of cleaning of buildings and garden maintenance • Recording data on O&M of pumping stations and STPs (Daily, Monthly, Annual) • Direction for operation during abnormal and emergency periods

No	Duty	Description
	O&M of pumping station, and treatment plant	2) Maintenance and Inspection <ul style="list-style-type: none"> • Establishment of guidelines, and preparation of maintenance and inspection plan for machine and electrical equipment • Preparing detailed plans and implementation of outsourcing the above activities 3) Rehabilitation and Replacement <ul style="list-style-type: none"> • Preparing detailed plan, design, and implementation of rehabilitation
9	Water quality control	a) Planning of water quality tests b) Execution of sludge quality test c) Execution of water quality test for industrial effluent d) Execution of survey and research e) Data compilation, analysis and report preparation f) Making decisions for the O&M manual g) Countermeasures in case of any abnormal situation h) Adjustment of water quality analysis equipment i) Close check of data
10	Ledger management	a) Preparation and keeping ledger b) Revising and reading ledger c) Maintenance of drawings and literature (Plan, profile, sewerage map, electrical system drawings, sewer networks drawings, etc.)
11	Environment conservation	a) Plan and execution of measures for air pollution b) Plan and execution of measures for noise and vibration c) Plan and execution of measures for odour d) Plan and execution for discharge of treated effluent to river
12	Others	a) Report to authority b) Understanding the status and improvement on safety and sanitation c) Guide to visitors d) Dissemination of knowledge and public awareness e) Training of staff and operators

Source: JSWA, 2003

Table 3.8 Designation and Responsibilities

No	Level of Management	Designation	Functional Responsibilities
1	Senior management	Chief Engineer	Strategies of long term objectives
			Determination of O&M
			Arrange for dissemination of O&M
			Approval of long term plan
		Superintending Engineer	Preparation of contingency plan
2	Middle management	Superintending Engineer	Formulation of long term plan
			Formulation of medium term plan
			Feasibility of O&M
		Executive Engineer	Consolidation of short term plan
3	Operational Management	Assistant/Executive Engineer	Operation of sewer and STP
		Junior Engineer	Water quality control
			Ledger management
4	Others	Plant Operator	Operations of the plant
		Electricians	Working on the electrical motors & systems
		Mechanics	Small repairs
		Civil	Small repairs of sewer & STP
		Chemist	Test of quality of sewage
		Sewerage Workers	Cleaning of screens, removal of grit, cleaning of aeration tanks and other units.

3.15 TRAINING NEEDS SUBJECTS / PERFORMANCE AREAS IDENTIFIED FOR ORGANIZING TRAINING INPUTS

- a) Chief Engineer
1. Corporate policy and management, personnel
 2. Management Information System – Automation
 3. Personnel management – Organizational development – Management of Urban utilities
 4. Bilateral/Multilateral funding and management
 5. Financial management – commercial pattern

- 6. Project management
- 7. Systems Engineering
- 8. Contracts – application of specifications
- 9. Quality engineering
- 10. Material planning and control
- 11. Construction management
- 12. Environmental impact assessment.
- b) Superintending Engineer
 - 1. Corporate planning
 - 2. Organizational behaviour
 - 3. Industrial relations
 - 4. Personnel management and industrial relations
 - 5. Management information system – applications
 - 6. Human resource development
 - 7. Project planning & control – computer applications
 - 8. Computer aided designing
 - 9. Standardization of designs
 - 10. Quality circles
 - 11. Material planning and control techniques
 - 12. Preparation of manual on servicing, repair, testing of electrical & mechanical equipment
 - 13. Analysis of industrial effluents
 - 14. Construction management
 - 15. Rehabilitation of structures
 - 16. Leakage rectification and cleaning of pipelines
 - 17. Programme planning and budgeting systems
 - 18. Bilateral/Multilateral funding – issues and problems
 - 19. Import procedures
 - 20. Commercial accounting
 - 21. Basic financial management
 - 22. Assets Management
 - 23. Emergency Protocols
- c) Other Engineers
 - 1. Construction management
 - 2. Project preparation – feasibility studies
 - 3. Project report writing
 - 4. Updating of codes and standards

5. Construction quality control
 6. Laying, jointing, testing and commissioning of sewers
 7. Sewer network planning
 8. Tooling for operations, maintenance and repair
 9. Civil structures – maintenance management
 10. Pollution – detection, prevention and control – techniques and applications
 11. Maintenance management
 12. Energy audit
 13. Basic instrumentation
 14. Project estimates – preparation and documentation
 15. Systems engineering – simulation/modelling
 16. Material testing and certification
 17. Total station survey – computerised analysis and mapping of survey data
 18. GIS methods: Preparation and updating maps
 19. Cleaning of sewers
 20. Rehabilitation of structures
 21. Office management – automation
 22. Industrial relations
 23. Fire fighting and first aid
 24. Material (stock accounting)
 25. MS office – Computer applications in office management
 26. Human resource development
 27. Management Information Systems (MIS) in urban utilities
 28. Basic financial management
 29. Commercial accounting – accounting in public utilities
 30. Planning and monitoring of metering and billing for water
 31. Basic business accounting
 32. Financial analysis – techniques
 33. Budgeting – Principles and applications
 34. Management accounting
 35. Stores accounting
 36. Costing, budgeting and accounting
 37. Financial ratio analysis
- d) All technical and non-technical office staff members (other than engineers)
1. Introduction to MIS – (Application to respective functions)
 2. Maintenance manuals – updating

3. Engineering drawing and as built documents
 4. Work execution – measurement recording and billing
 5. Water quality testing and control
 6. Preparation of estimates
 7. Sewer cleaning techniques
 8. Scouring and cleaning techniques
 9. Data collection and statistical analysis
 10. Computer applications
 11. Personnel management
 12. Labour laws and industrial relations
 13. General management – introduction
 14. Office management – automation
 15. Metering, billing and customer services
 16. Commercial accounting – procedures
 17. Budgeting and audit – procedures
 18. Capital budgeting – procedures
 19. Costing, cash flow and credit management – procedures
 20. Stores accounting – procedures
 21. Book keeping and accounts
 22. Preparation of budgets
 23. Materials (stock) accounting
 24. Management accounting
 25. Costing, budgeting and accounting
- e) Specific Training Course
- i. Planning and design of sewer systems
 - Basic plan of sewerage facilities
 - Fundamentals of storm water discharge
 - Hydraulics of sewerage facilities
 - Design of sewer
 - Fundamentals and practice surveying
 - Design exercises.
 - ii. Planning and design of treatment plants and pumping stations
 - Basic plan of sewage treatment and pumping facilities
 - Principle of sewage treatment
 - Design of the sewage treatment plant and pumping station

- Hydraulics of sewerage facilities
 - Design exercises
- iii. Planning of mechanical and electrical equipment
- Basic plan of sewerage facilities
 - Principle of sewage treatment
 - Machines for sewage treatment
 - Electrical equipment for sewage treatment
 - Pumping station
 - Equipment supervision
 - Design exercises
- iv. Construction Supervision
- Principles of sewage treatment
 - Fundamentals and practice of surveying
 - Construction plan
 - Construction management
 - Quality control
 - Inspection
- v. Fundamentals of operation and maintenance
- Principle of sewage treatment (basic)
 - Operation control of sewerage facilities (basic)
 - Practice implementing operation control of the pumping station
 - Machine operation control for sewage treatment (basic) exercises
 - Operation of electrical equipment and appliances for sewage treatment (basic) exercises
 - Field exercises
 - Safety rules
- vi. Operation and maintenance (advanced)
- Principle of sewage treatment (advanced)
 - Operation control of the sewage treatment facilities (advanced)
 - Machine operation control for sewage treatment (advanced) exercises
 - Operation control of electrical equipment and appliances for sewage treatment (advanced) exercises
 - Water quality control (data control)
 - Field exercises
- vii. Water quality analysis (basic)
- Principle of sewage treatment (basic)

- Outline of water quality analysis (basic)
 - Water quality analysis (basic) exercises
 - Effluent standard exercises
- viii. Water quality analysis (advanced)
- Principle of sewage treatment (advanced)
 - Outline of water quality analysis (advanced)
 - Water quality analysis (advanced) exercises
 - Biology of sewage treatment
 - Water quality control
- ix. Management of sewerage
- Outline of sewerage facilities
 - Laws and codes for sewerage
 - Outline of economics
 - Costs for operation control of sewerage facilities
 - Financial administration of sewerage
 - Sewer charge collection procedure
- x. Water quality control
- Chemistry of water supply and sewer
 - Necessary supplies of sewage treatment technology
 - Sewage treatment facilities inspection and inspection standards
 - Effluent surveys
 - Discharge permission procedure
 - Field exercises

3.16 NEED FOR CAPACITY BUILDING OF OUTSOURCED O&M PERSONNEL

As for O&M, the approach in India is to outsource the unskilled and semi-skilled labour component only. Their job involves O&M of equipment only like motors, pumps, valves, electrical switchgears, etc. For the semi-skilled labour, their duties do not involve process control.

The responsible supervision will be with the ULBs only. In order to promote the quality of O&M, it is necessary to provide capacity building of outsourced O&M personnel in private sectors.

These types of training are already available with the Industrial Training Institutes (ITI) and diploma level courses. ITI are training institutes constituted under Directorate General of Employment & Training (DGET), Ministry of Labour & Employment. They provide post-school training in technical fields. Systematic on-the-job training is also helpful for the safety and efficiency of the O&M works. ULBs should recommend the outsourced company to conduct on-the-job training to its employees for dissemination of skills. Refer to Section 3.7 of this manual.

The qualification for a contractor to be awarded an O&M contract by the ULB shall include not only the qualification of the contractor firm itself in previous O&M works, but also the CV and qualification and adequate experience of key personnel in the O&M staff mentioned in the document. The ULB should ensure that such personnel to be engaged for O&M shall be given training programme during the O&M period through the existing training institutes of major utilities / ULB's in the region and this should be mandated in the tender document for outsourcing of the O&M work. Incentives for career advancement of operators, like for example, timescale in ULB services and additional allowances such as risk allowance or such other chances have to be explored to ensure efficient O&M of sewerage systems.

3.17 NEED FOR APPLIED R&D IN SPECIFIC ASPECTS

There exist technologies and systems for any given problem. The solution has to be sustainable, appropriate and in specific cases data either in the short term or long term are not readily available. This situation needs to be addressed and specific focus in terms of applied R&D is required. Applied R&D is different from fundamental R&D in that its aims and objectives are specific to a given situation and local practices for upgrading the management skills. Given this definition, the projects listed in Appendix C 3.3 are considered as the crucial need for our country at this time to fill the knowledge gaps in areas of day-to-day practices in sewerage in India.

3.18 STATE SANITATION STRATEGY

3.18.1 Intra-Institutional Co-ordination

The achievement of total sanitation has been engaging the attention of the ULBs and states recently in response to the NUSP of the MoUD. Clearly, this requires intra-institutional co-ordination in the ULBs to implement in a concordant and well-designed sequence of both Sewerage and Municipal Solid Waste (MSW) matters. Even within the sewerage, there is dual control in some states and ULBs. For example, there is the case of Tamil Nadu Water Supply and Drainage Board (TWADB). This is perhaps the first of its kind formed in India in 1971. At that time, the functions of water and sewerage were handled by the state Public Health Engineering and Municipal Works Department as a branch of the Public Works Department. This made it difficult to avail sizable loans exclusively for water supply schemes especially in rural water supply. Hence the TWADB was created for exclusive receipt and accounting of sizable loans.

This did serve well and within a decade, all rural sections were covered at least with drinking water supply facilities, which were India Mark II hand operated pump sets, which required very little maintenance, which was managed by a flying crew in micro zones. However, when it came to sewerage schemes the same were implemented no doubt, under loan cum grant schemes, but the ULBs were hesitant to take over completed schemes due to near impossibility of generating revenues matching the O&M expenses. The state Government is making up the position. Similar is the position almost everywhere the similar Boards are in place. There is the Mumbai Mahanagar Palika, which takes care of total sanitation within its other social services. The revenue generation by this agency makes it viable, but the same is almost a rare position in the country.

3.18.2 Need for State Level Co-ordination by a Sanitation Committee

Given this position, the achievement of total sanitation was an escalating situation. It needed co-ordination in the initial planning and then the need-based allocation of revenues.

The states of West Bengal, Odisha and Madhya Pradesh have announced their urban sanitation strategies. An extract of the strategy as developed on the basis of stated principles is as under:

- a. Sanitation Promotion should be demand-driven and community based: Household sanitation is first and foremost the responsibility of a household. It should be demand-driven i.e., communities and households should show their priorities by a willingness to pay, in cash or kind, a significant portion of the costs involved in providing and running a sanitation system.
- b. Sanitation services should be provided as a human right: Government should create an enabling environment through which all the citizens can access sanitation services and support in obtaining those services, but in the end it should be the responsibility of individuals.
- c. Balanced degree of conformity for healthy environment: The use of scarce public fund should be confined to assist those who are unable to attain a basic level of services. Individual households are ultimately responsible along with communities and should require a degree of conformity to achieve the healthy environment. A careful balance in affordability needs to be achieved between households, communities and state economy.
- d. Equitable distribution of resources: The limited available resource of Central and State for sanitation should be equitably distributed throughout the ULBs according to population and level of development.
- e. Economic value of water: The way in which sanitation services are provided must take into account the growing scarcity of good quality water. The true value of these services should be reflected in such a way that it does not undermine long term sustainability and economic growth. The pollution of water resources also has an economic cost.
- f. User Pays: Sanitation system should be sustainable. The users should pay against use to maintain sustainability. Similarly, polluters should pay for the cost of cleaning up the impact of their pollution on the environment.
- g. Integrated development: Sanitation development is not possible in isolation from other sectors. There are a direct relationship between water supply and sanitation, and their combined impact on health. Coordination is necessary between different departments, all tiers of Government and other stakeholders.
- h. Environmental integrity: The environment must be considered in all development activities. Appropriate protection of the environment should be applied, including if necessary prosecution under the law is required. Sanitation services, which have unacceptable impacts on the environment, cannot be considered to be adequate.

- i. Sanitation promotion leads to health promotion: Sanitation is not just the construction of toilets, it is a process of improvements which should be accompanied by promotional activities as well as health and hygiene education. The aim is to encourage and assist people to improve their health and quality of life.
- j. Sanitation is a Community Responsibility: Improvements in health through improved sanitation are most likely to be achieved when the majority of households in a community are involved. Sanitation is therefore a community responsibility and this should be emphasized through sanitation awareness programmes.

The Madhya Pradesh urban sanitation programme announces a co-ordination as in Figure 3.2.

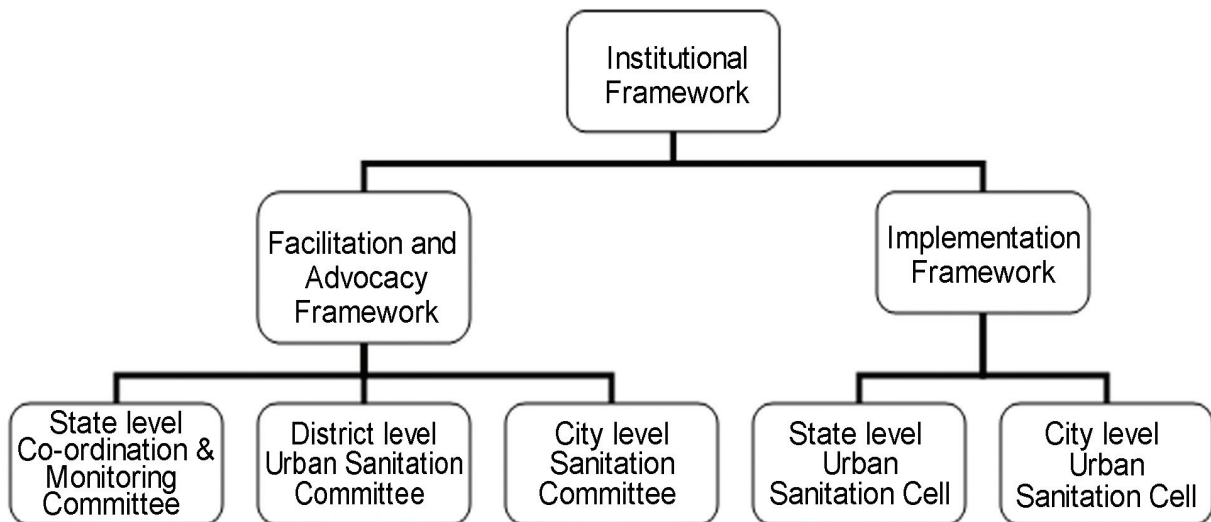


Figure 3-2 Inter and Intra Department Co-ordination in the Madhya Pradesh Urban Sanitation Programme

The programme planning sequence is in Figure 3.3 overleaf.

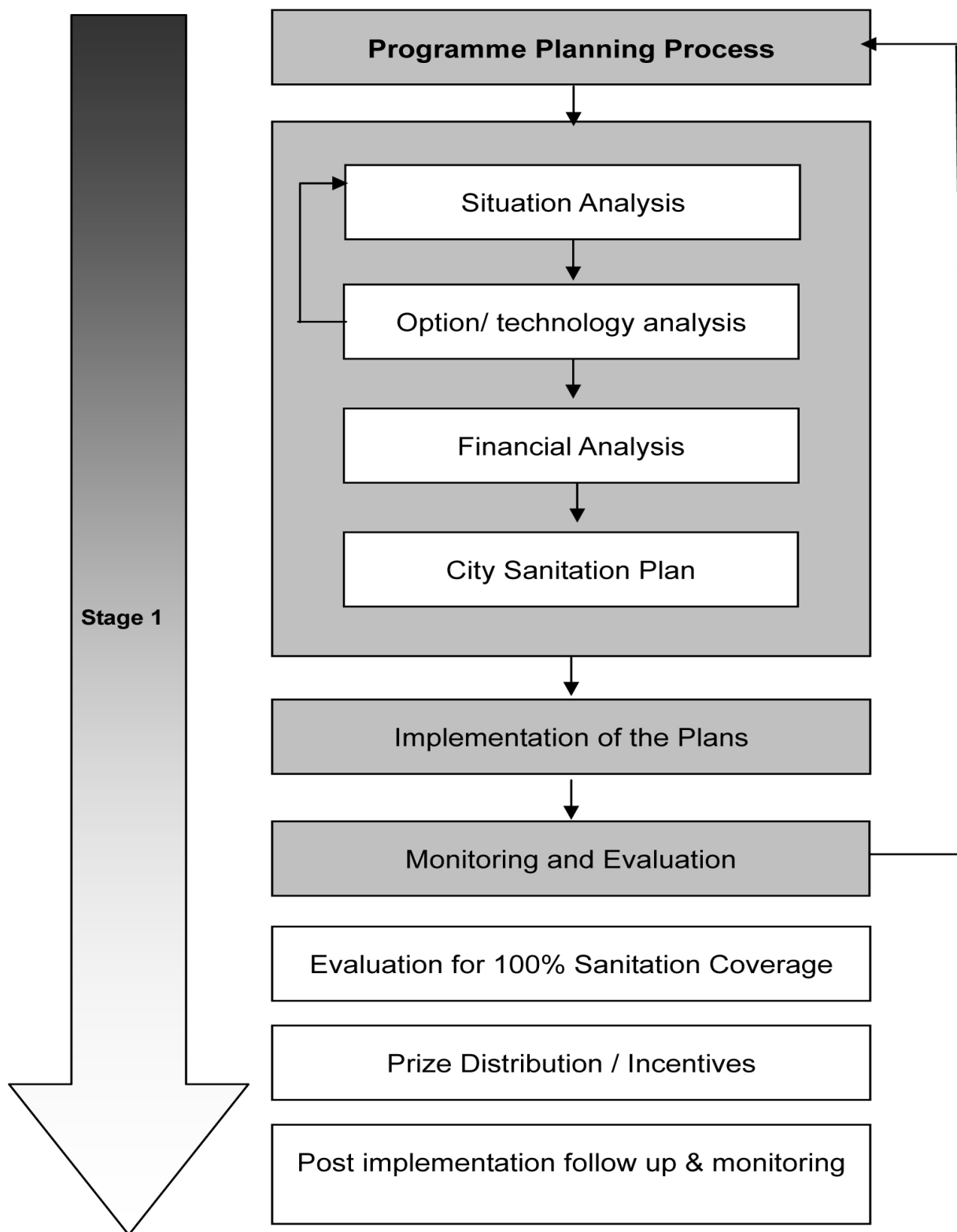


Figure 3-3 Situation Analysis to Post Implementation Follow up Programme in the Madhya Pradesh Urban Sanitation Programme

In the case of the Odisha sanitation strategy, a notable feature is the programme specifically targeting the state as free of open defecation by 2016 to be in line with the MDG as shown in Figure 3.4 overleaf.

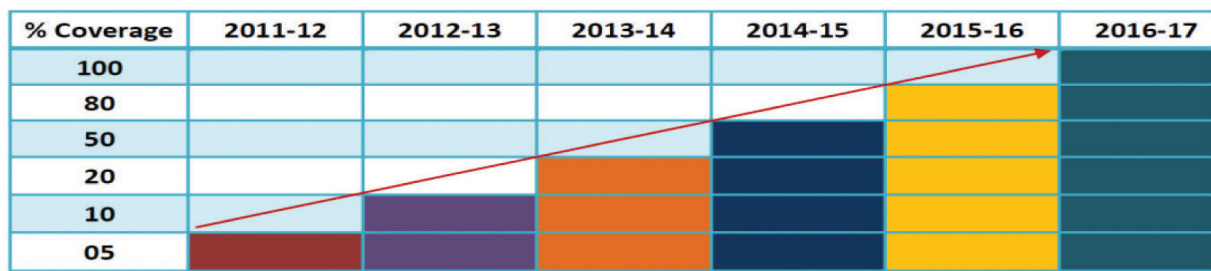


Figure 3.4 Open Defecation Free Status of Cities Aimed to be Achieved by the State of Odisha.

The colour code is in line with the MoUD categorization scheme for rating of cities as in Figure 3.5.

No.	Category	Description	Points
1	Red	Cities needing immediate remedial action	< 33
2	Black	Needing considerable improvements	34-66
3	Blue	Recovering	67-90
4	Green	Healthy and Clean city	91-100

Figure 3.5 Categorization of Scheme for Rating of Cities under MoUD

It is recommended that states formulate and implement their respective urban sanitation strategies keeping within their own respective priorities of financial and social positions.

3.19 SUMMARY

A brief description has been made about institutional aspects and capacity building through training of staff-members of relevant agency/organization.

For sustainable development, operation and management of sewerage and sanitation facilities, it is essential to lay emphasis on capacity development of relevant staff-members to update them on improved and more effective methods of O&M, recent advances in technology and management in sector, etc.

Therefore, planning of training programmes on a regular basis and allocating required funds for training, field trips, visits to other countries, at the planning stage of the project is indispensable. Evaluating the impact of the training on the participants and efficiency of the management of system itself is recommended; and if required, modifications should be made in training procedures.

The approach should be such that the trained staff remain in the organization after receiving training for providing their services and do not leave the organization as soon as a better opportunity is available. This of course is not easy unless time bound promotions are guaranteed and services akin to civil services are created to these personnel.