

**TOTAL QUALITY MAINTENANCE
IN LCOAL GOVERNMENT
OPERATIONS AND MAINTENANCE**

TQMn Book 2

**PARTICIPANT'S PRE-WORKSHOP
ASSIGNMENT**

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INTRODUCTION TO TQMn (FOR MANAGERS PLANNING TO ATTEND AN O&M WORKSHOP)

TQMn

It is a crime the way most local governments conduct their operations and maintenance (O&M) programmes." How many times have you heard someone say something similar about this aspect of local government service? Unfortunately, the allegation has a bitter ring of truth to it. Local governments in most developing countries have not given enough attention or allocated adequate resources to these critical functions. While there are many reasons for this lack of attention to operations and maintenance, the overall consequences are devastating, both in real costs to the local government and diminished service to the citizens. For these reasons, UNCHS (Habitat) is offering this workshop on Total Quality Maintenance. It is designed to help you and your local government become better equipped to launch a successful O&M programme. But first, let us go back to the scene of the "crime."

Our first witness to this crime is Peter Drucker, the venerable management expert who has been telling us how to manage organizations, tasks, and people for the past forty years. For Drucker, the key to good management is in the diligent, ongoing attention to matters of efficiency and effectiveness within the organization. In Drucker's terms:

- Effectiveness is doing the right things
- Efficiency is doing things right.

It is simple rhetoric, but the implications are profound for those policy makers and managers who ignore these bottom line criteria of performance.

TQMn - doing the right things

Just about everybody agrees that the operations and maintenance of local government infrastructure and other physical assets is "the right thing to do." The irony is that few persons who are in a position to do something about it, do not do the right thing. For many reasons, O&M requirements continue to be ignored when resources are allocated in local budgets and loans and grants for local government infrastructure investments are approved by external support agencies.

One of the first steps in the process of installing an effective and efficient O&M programme in your local government is to convince the policy makers, and other allocators of scarce resources, of its importance. Convincing these individuals will not be easy. They are bombarded with requests and demands from all sides. When it comes to deciding who gets what in the annual budget, or whether funds should be allocated to O&M functions in a capital project, decision makers are not given convincing evidence that O&M is really that important. So the burden is on you, not just to do O&M right (*efficiency*), but to convince others that it is the right thing to do (*effectiveness*).

This workshop will take the position that the operations and maintenance dilemma in most local governments, and specifically in your organization, is a problem that needs to be solved. To solve this problem, you must understand it. To convince others that it is a problem worth solving, they must understand it. The first step in problem solving is problem finding or gathering data and information that will help you understand the problem better and assist you in describing that problem to others. The O&M problem is not only a problem now, it is also a problem in the future. What you do today in the operations and maintenance of infrastructure and other physical assets will have long-term consequences.

Data gathering is task one

If your participation in this workshop is to be effective, (to do the right things to help solve your O&M problem), you need to come with information about your problem. Step 1 in Total Quality Maintenance (TQMn) is data gathering. It is a task that you are expected to perform before coming to the TQMn workshop. In other words, it is part of the price of admission.

Some questions have been put together that will assist you in this data collection task. Like most questionnaires of this kind, it may be necessary to modify it to meet your specific needs. If so, do not hesitate to make these changes. The importance of this task is the opportunity to examine one of your O&M functions in some depth during the workshop and, by sharing your experience, help other workshop participants learn more about how to manage the O&M challenge.

Responding to this information gathering task will help you get ready to be a full participant in the TQMn workshop. The format provided below is designed to assist you:

- Pull together information needed to be an active workshop participant, and
- Prepare you and your management team to install a Total Quality Maintenance programme in your local government.

THE DATA GATHERING ASSIGNMENT

Gathering Data

Overview

For purposes of the TQMn workshop, we want you to narrow your definition of the operations and maintenance problem to one specific area of operation, even though you may be responsible for a much wider range of programmes and services. For example, you may want to look at your fleet operations and maintenance problem or the refuse collection and disposal programme or street maintenance (to name just a few). While you may be tempted to bring information to the workshop about all of your O&M responsibilities, there will not be time to work on more than one function. On the other hand, it is highly unlikely that all the participating teams will select the same problem area to explore during the workshop. This should give each of you an opportunity to gain new insights into a wider range of O&M situations. Furthermore, the workshop is designed to provide a process that can be applied to all operations and maintenance challenges. Much of what you learn about one O&M problem will be applicable to most others and give you a set of tools to use when you return home.

Definitions

Before going further, it will be useful to define what is meant by "operations" and maintenance."

- **Operations:** the procedures and activities involved in the actual delivery of services to the public.
- **Maintenance:** the wide range of activities aimed at keeping infrastructure and utility networks, buildings, plant, and equipment in serviceable condition.

In most local governments, there is no clear distinction between operations and maintenance. They are often inter-related activities conducted by the same personnel (e.g., central to the operation of a water plant are equipment and systems maintenance responsibilities). Given this ambiguity, the workshop will focus more on the maintenance function than operations. Not to worry. The process of decision making and problem solving to be pursued in the workshops is equally applicable to both of these inter-related functions.

An obvious constraint

An obvious constraint to providing a data gathering format for a wide range of O&M activities is the distinct possibility that the tools will not fit every situation. Of course, since participants will be working in teams, they are likely to focus on one set of data. However, you may find it necessary to modify the tools, and we trust you will be prepared to do that, whenever necessary, to help teams carry out their tasks.

A PRE-WORKSHOP DATA COLLECTION WORKSHEET

Work-Sheet

Note: Workshop participants are expected to complete the following questionnaire before attending the TQMn workshop and to bring the information with them to the workshop. This is important! The data and information will form the basis for individual and group problem solving activities during the workshop.

Your Name _____ Workshop Date: _____

Local Authority _____ Location _____

1. Identify the O&M area you want to explore during the **TQMn Workshop** by checking one of the blocks with a tick below. **Note: Be specific and narrow your choice to one O&M function that can be explored in depth during the workshop.**
 - Roads and bridges
 - Sewerage systems
 - Solid waste services
 - Vehicle maintenance
 - Water supply
 - Other (specify)

2. Describe the operations/maintenance function identified in **Q.1** in quantitative terms (e.g., # of vehicles to maintain, kilometers of streets to maintain, total # and types of customers to serve with waste collection).

3. Describe in as few words as possible the major constraints you face in this area of operations and maintenance (e.g., political, financial, technical, environmental, social/cultural).

4. Describe the immediate and long-term consequences of operating within these constraints:
Immediate consequences

Long-term consequences

5. What maintenance strategy is most often used by your organization to carry out its O&M functions? To answer the question, indicate with a check mark where your organization lies on the following continuum of maintenance strategies. The continuum ranges from crisis maintenance on one end to planned, preventative maintenance on the other.

1	2	3	4	5
<i>Crisis Maintenance</i>	<i>Unplanned, Required Maintenance</i>		<i>Planned, Preventative Maintenance</i>	

In the space below, describe:

a. The management strategy used by your organization for its O&M functions.

b. The strengths and weaknesses of this strategy.

c. Another strategy better suited for effective performance of your organization's O&M functions.

6. Is there one specific *policy* that has an adverse effect [impact] on the planning and implementation of this O&M function? If so, please summarize it below and state why it is a problem. If possible, bring a copy of this policy to the workshop.

Description of the policy:
Statement of the problem it causes:

7. Is there one specific *administrative procedure* that has an adverse effect [impact] on the planning and implementation of this O&M function? If so, please summarize it below and state why it is a problem. If possible, bring a copy of this administrative procedure to the workshop.

Description of the procedure:
Statement of the problem it causes:

8. Is there one specific *organizational habit* that has an adverse effect [impact] on the planning and implementation of this O&M function? If so, please summarize it below and state why it is a problem.

Description of the habit:
Statement of the problem it causes:

9. Provide three years of financial information on the O&M function identified above including figures in your own local currency on expenditures, revenues, and indebtedness. Indicate for each source if the trend over the three years reported is **up** (+) or **down** (-)

Source	Year 1	Year 2	Year 3	Trend	
	19__	19__	19__	Up	Down
				+	-

Revenue				
Service charges				
License/permit fees				
From other govt's				
Other revenue				
Total revenue				
Expenditures				
Salaries & wages				
Contractual services				
Supplies & materials				
Capital equipment				
Debt service				
Other expenditures				
Total expenditures				
Long term debt				
Bonds				
Loans				
Other borrowing				
Total debt				

10. Concerning the financing of this O&M function, what cost recovery or cost containment strategies are you using now? Describe these strategies briefly below.

11. What strategies are you using to increase existing revenue or tap new revenue sources? Describe these strategies briefly below.

12. List below those trends or forces you believe will have an impact on the future financing of this function?

13. Identify the personnel assigned to this function by completing the personnel resource table shown below. Use actual position titles whenever possible on the blank lines provided on the left column of the table entitled "Assigned Personnel." Indicate the number of personnel assigned to each position by employment status (indicate the number full-time and the number part-time) and by classification of each position 19 in one of these five categories:

- **Administrative** (e.g., superintendent, foreman)
- **Professional** (e.g., engineer, planner)
- **Technical** (e.g., mechanic, draftsman, equipment operator)
- **Clerical** (e.g., secretary, counter clerk)

- **Laborer** (e.g., any manual skills worker)

Assigned Personnel	Status		Classification				
	Full Time	Part Time	Adm	Prof	Tech	Cler	Lab
1.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Personnel							

14. Make an inventory of equipment, both mobile and stationary, currently allocated to serve this O&M function. Include **all** equipment regardless of its condition and operating status. List each piece of equipment separately in the space below. About each piece of equipment provide the following information:
- Type (e.g., dump truck, air compressor, road grader)
 - Age (in years)
 - Condition (specify as either 5 = excellent, 4 = good, 3 = fair, 2 = poor, or 1 = unusable)
 - Days used per year (enter number of days)
 - Appropriateness for the task (specify as either totally appropriate = 100%, totally inappropriate = 0%, or something in between)
 - Difficulty in keeping maintained (specify as either not difficult, moderately difficult, or very difficult)

Inventory of equipment by Type	Age	Condition					Days used per year	Task appropriateness	Maintenance Difficulty		
		5	4	3	2	1			Not	Mod	Very
1.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		_____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. List the various types of tools and materials used in this O&M function those that cause you the most difficulty in day-to-day operations and maintenance. Tools might include such things as wheel barrows, shovels, tote barrels, ladders, mowers, hand tools, typewriters, photocopiers, and so forth. For tools, indicate in the space below the number on hand and the number needed to operate efficiently. Materials might include chemicals, building materials, pipe fittings, paving material, uniforms, stationery, and so forth. For materials, indicate in the space on the next page the quantity required for a typical year (number, volume, weight, or other measure as appropriate). Specify the degree of difficulty in acquiring these tools and materials as either difficult, moderately difficult, or not difficult, by checking the appropriate block.

O&M Tools	Number		How difficult to acquire		
	On hand	Needed	Very	Moderate	Not
1.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

O&M Materials	Annual Quantity	How difficult to acquire		
		Very	Moderate	Not
1.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. List any other information you believe will be useful in analysing this O&M function and determining how the function's effectiveness and efficiency might be improved.

Thank you for taking time to complete this important first step in the TQMn Workshop. Remember to bring these materials with you to the workshop you are scheduled to attend. This is important! The learning value of the workshop for you is directly linked to the information contained in this inventory.