



## Checking Environmental Performance

### Learning Outcomes

**By the end of this unit the learner will be able to:**

- ✓ Describe how to monitor, measure and evaluate the effectiveness of implementation.
- ✓ List the key stages of the environmental audit process.

## Checking Environmental Performance

The environmental performance evaluation (EPE) is an assessment which aims to keep managers up to date with reliable information on how well an organization's environmental management system is performing. The EPE uses indicators to gather this information, and compares current and previous performance with the criteria for environmental performance stated in the organization's EMS.

### The PDCA Cycle of an EPE

As with the EMS itself, a Plan-Do-Check-Act cycle is useful when conducting and developing an EPE.



Fig. 1.1: application of PDCA cycle in an EPE

#### Planning the EPE

If an EPE is to be effective, it should be incorporated into the everyday activities of an organization. It must focus on significant environmental aspects, the performance evaluation criteria stated in the EMS, and any extra requirements of interested parties.

When planning an EPE, all of the organization's activities, products and services should be accounted for. Financial, physical and human resources needed for managing the EPE must be provided by the

management. Depending on the capability and resources of the organization, the focus of the initial EPE may be limited to high-priority activities, products or services. The scope of the EPE can be extended later to include the rest.

No single measurement can accurately reflect a company's overall environmental performance. A properly selected set of multiple measures is required to provide the information necessary for making important decisions.

Good management practices include regular monitoring on both a short- and long-term basis. An effective monitoring process provides on-going, detailed information on company performance. The monitoring process provides an opportunity to:

- a) Compare implementation efforts with original goals and targets
- b) Determine whether sufficient progress is being made toward achieving expected results
- c) Determine whether the time schedule is being observed

### **Monitoring**

An effective monitoring and data management system records the performance of all the institutions involved, holding them accountable for achieving the goals stated in the **integrated management system (IMS)**.

An effective system ideally includes the following:

- Clearly defined goals and a set of indicators to measure performance
- A schedule and set of guidelines for all responsible parties to report to one another
- An opportunity for responsible parties and stakeholders to meet regularly
- Timing reports in order that relevant city legislature might be adjusted based on the results

### **Collecting Data**

When preparing to collect data, the following questions should be considered:

- For which indicators are data currently being collected?
- What are the key information sources?
- Are representatives from these information sources already involved in the IMS process?
- How valid and accurate are the data?
- Are the data easily accessible and available?
- Are there any costs associated with acquiring the data?
- When no data currently exist for an indicator, what steps should be taken to collect new data?
- How expensive would a new data collection process be?

Ideally, most monitoring processes include the collection of both quantitative and qualitative data. **Quantitative environmental data** are information about the environment that can be counted and measured. **Qualitative environmental data** focus on actual environmental improvements, such as the

amount of waste reduced or energy saved. Systems for collecting quantitative environmental data are usually very specific. For instance, actual water consumption may be measured with water meters.

Qualitative data are more difficult to measure. They include assessments of problems encountered, stakeholder satisfaction, and unanticipated benefits. Qualitative data can give a real understanding of the actual impact of an organization's actions. They are usually collected via tools such as surveys and interviews.

Both types of data are necessary to fully understand a situation. For example, a town with a persistent water shortage may decide to begin a water conservation program. The program will involve installing low-flow showerheads in people's houses. A quantitative data collection effort would focus on how much water has actually been saved, while qualitative data would show the extent to which consumers were satisfied consumers with their new showerheads. Both types of information are important for determining whether the program was successful.

A system for collecting data can be as simple as using standardized reporting forms or as complex as a computerized data-sharing network. It doesn't matter how advanced a system is. What matters is how accurately the indicators and monitoring methods accurately reflect progress, as well as whether the data might aid the understanding of causes and solutions when certain goals are not being met.

Data collection should be well-organized and easy to reproduce. This means the system must:

- Outline existing data sources in the form of inventories and a meta-database
- Prepare templates and guidelines on data handling, data documentation, and the methods used for analyzing the data
- Maintain hard or digital copies of factsheets which describe the source, quality, gathering methods, and any other relevant information regarding each data set and indicator.

Each institution submits information based on the data gathered to a responsible coordinator who then compiles this information into a report. The more specific the coordinator is when determining which departments monitor what, the easier the data collection process.

### Monitoring Data

In collecting data, it is also important to distinguish between the monitoring of compliance and effectiveness. **Compliance monitoring** measures whether the institution did what it said it was going to do, while **effectiveness monitoring** measures whether the actions achieved their intended result. While effectiveness is crucial for success, compliance is important for determining the cause when a company fails to meet its goals.

A good monitoring and evaluation process engages all stakeholders and is useful to those responsible for improving the project. Evaluation is also an important public awareness and educational tool. The goal is to avoid unnecessary effort and report as efficiently as possible.

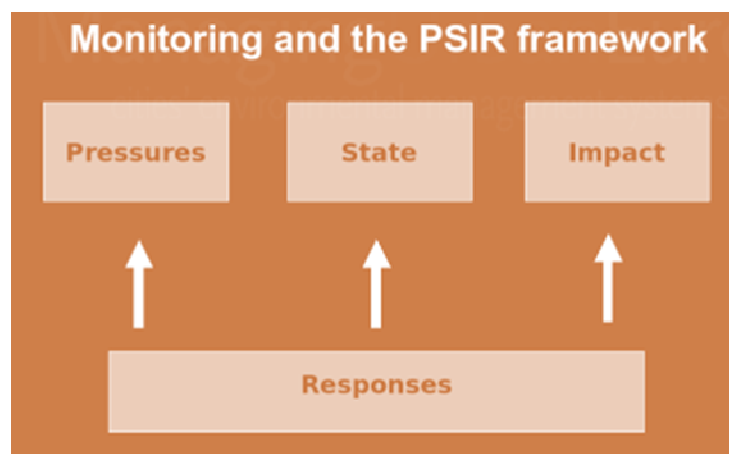
Monitoring actions is easier than monitoring their effects. To do so, the coordinator needs feedback from the responsible parties in order to answer the following questions:

- Was the activity realized?
- Was a timetable agreed upon? If so, what milestones or goals did it set?
- How were resources assigned?
- Were there any modifications? If so, what were they?

This information helps the coordinator ensure that the process of implementation follows the instructions in the action plan.

### Pressures-State-Impact-Response (PSIR) Analysis

The **pressures-state-impact-response** framework describes how society interacts with the environment. When applying it to environmental management, it becomes obvious that all four areas require monitoring.



**Fig. 1.2: monitoring and the PSIR framework**

For example, to monitor the effectiveness of an action – say, a noise protection wall – all of the following must be measured:

- whether the wall has been erected (response)
- whether the noise level has been reduced as a result of the wall being erected (state)
- whether the source of the noise has decreased for other reasons (pressure)
- whether the affected people living in the area are suffering less disturbance now (impact)

## Corrective Measures

A well-organized monitoring system will quickly recognize whether and when things don't go as planned. Mistakes should be analyzed immediately, corrective measures taken as soon as possible, and damage or loss minimized to the best of the organization's abilities.

## Communication

The effectiveness of the implementation of a program depends on the support and cooperation of various stakeholders. At this stage, questions about cooperation and involvement begin to arise. Is communication sufficiently inclusive? Are all parties involved working together to achieve sustainability? Are the targets and timetables realistic? Are the indicators available and measurable? In order to take action, all of these issues must first be addressed.

Furthermore, the public needs to be aware of the action that is about to be implemented. Informing the public may be key to the success of implementation – it may even determine whether or not implementation occurs in the first place, depending on the extent to which the area's citizens will be involved in the process.

## Environmental Auditing

As we discussed in Unit 4, environmental auditing is a tool for measuring the environmental effects of certain activities. Environmental auditing is used for investigating effects, understanding these effects, and identifying ways of dealing with negative effects.

The International Chamber of Commerce (ICC) defines auditing as:

- A management tool comprising systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of helping to safeguard the environment by facilitating management control of practices and assessing compliance with company policies, which would include regulatory requirements and standards applicable. (ICC, 1989)

The key principles of auditing include:

- **Verification:** audits evaluate compliance with regulations or other set criteria.
- **Systematic:** audits are carried out in a planned and orderly manner.
- **Periodic:** audits are scheduled regularly.
- **Objective:** information gained from the audit is reported without bias.
- **Documented:** notes are taken during the audit and the findings recorded.
- **Management tool:** audits can be integrated into a management system.

There are a number of benefits to environmental auditing. Some are easily recognized, while others are less easy to identify. Two of the more obvious benefits are:

- increased management effectiveness
- cost savings

### **Increased Management Effectiveness**

To manage an organization effectively, management must be aware of every aspect of the organization's operational procedures and processes. An environmental audit should reveal any weaknesses in the system, as well as inform management on how to deal with these weaknesses.

Audits help reveal issues which management may have overlooked, especially in the case of large organizations which may operate in multiple facilities, where managers are often located at a distance and have many different processes to keep track of. The use of environmental audits can provide management with reassurance that any actual or potential risks have been identified.

However, auditing by itself does not improve environmental performance. An environmental audit merely provides a picture of what is happening at that particular moment. It is up to management to use that picture to take actions that will improve overall effectiveness.

### **Cost Savings**

Environmental audits often save organizations money in the long run by highlighting opportunities for improvement. Take waste disposal, for instance. Depositing waste costs money in the form of landfill fees and paying for special treatment of certain chemicals. An audit may reveal ways of reducing the amount of waste produced by the organization, which will lower the cost of waste disposal (since there will be less waste to dispose of). A waste-exchange scheme – that is, the process of selling waste to other businesses which can use it as raw materials for production – may also be an option.

Audits also help organizations to ensure that they are fulfilling all of their legal obligations, which in turn helps avoid costly fines and other legal fees later on, as well as expenses related to clean-up, compensation, and other response measures. Additional financial benefits may result from audits in the form of reduced insurance premiums.

### **Other Benefits of Auditing**

Less obvious potential benefits of environmental auditing include:

- increased staff awareness of environmental policies and responsibilities
- reassurance that a facility is both safe and compliant with legal standards
- favourable publicity
- improved relationships with regulatory authorities
- better understanding of consumer demands

### **Disadvantages of Auditing**

Despite the many benefits of an environmental audit, there are a few disadvantages associated with the process of auditing as well, such as:

- disruption of plant activity while the audit is conducted
- the cost of auditing
- negative staff perceptions of the auditing process

Most of these can be minimized or overcome by careful planning to ensure that the audit runs smoothly. Adopting an informal and approachable attitude and pointing out the positive aspects of auditing can help improve staff perception of the process. The cost of the audit can often be recovered by savings made through improvements identified in the audit.

## Different Types of Audits

The way in which an environmental audit will be pursued depends on what the organization is seeking to achieve. There are different types of audits to address different focuses. However, one of the problems that arise when discussing auditing is the fact that many different names exist for each type. Below is a list of basic audit types, as well as other names for each type (Humphrey and Hadley, 2000).

- **Corporate audits**, which include the following subtypes:
  - **Compliance audits**
    - Regulatory audits
    - EMS audits
    - Internal standards audits
  - **Liability audits**
    - Pre-acquisition audits
    - Divestment audits
    - Insurance audits
    - Due diligence audits
  - **Single Issue audits**
    - Waste minimization audits
    - Transport audits
- **Product audits**
- **Lifecycle Assessment audits**

Other terms you may come across include the following: health and safety audit, site audit, and activity or operational audit.

Compliance (or legislative) audits assess whether legal requirements have been met. Liability (or transactional) audits are conducted before buying or selling land in order to identify potential financial and legal issues. Single-issue audits, as the name suggests, concentrate on one issue – for instance, waste or water – and look for ways of reducing waste or consumption.

Policy compliance audits are primarily internal management tools. They determine the depth of compliance with company policy. They should also inform plans for the future. EMS audits are also internal audits, and they are part of any management systems approach. They help an organization determine the effectiveness of an EMS, as well as ways of improving its effectiveness.

Irrespective of the objectives, carrying out an environmental audit essentially involves three main questions:

- What are the organization's current effects on the environment?
- Can the negative effects be reduced?
- How can the organization's environmental performance be improved?

This applies equally to an audit of an entire organization, a single site, or even a specific issue.

## The Audit Process

The audit process can be broken down into a number of audit phases.

### Phase 1: Planning

This is to ensure that the audit is conducted in an effective and efficient manner. Planning involves all the issues the auditor should consider when developing an overall strategy for conducting the audit. This phase should result in a written plan that outlines the overall strategy and the nature, extent and timing of the audit work.

### Phase 2: Gathering Audit Evidence

After the planning of the audit, the audit itself is carried out. During this phase, solid evidence must be gathered which will support the auditor's final report. The auditor gathers evidence by performing **substantive audit procedures** and, when applicable, **a test of controls**.

When performing substantive procedures, the auditor can either perform manual tests or use **computer-assisted audit techniques (CAATs)**, or both. These CAATs are referred to as **data CAATs**. Data CAATs can be used to select samples, organize information, analyze data, and create reports to identify items that require further investigation, as well as to recalculate totals and calculations.

In addition to basic audit procedures, a test of controls may be performed either when an auditor wants to check the reliability of the controls, or when sufficient audit evidence cannot be produced through substantive procedures. The auditor will only test key controls – that is, controls that relate to the reliability of the figures in the organization's financial statements. The auditor is, therefore, is not interested in testing controls that contribute only to efficiency or the provision of good service.

When testing controls, the auditor can perform manual tests or use CAATs, or a combination of the two. The CAATs used for testing controls are referred to as **system CAATs**. Should the auditor decide to rely on CAATs when testing controls, he/she should test both general and application controls.

### Phase 5: Completing the Audit

Once the auditor has finished gathering evidence, the audit enters the completion phase. During this phase, the auditor must ensure that he or she has obtained sufficient evidence to support his/her conclusions.

### Phase 6: Reporting

The final step in the audit process is to evaluate the results of the evidence and form an appropriate conclusion. The auditor's report is the main output of the audit.

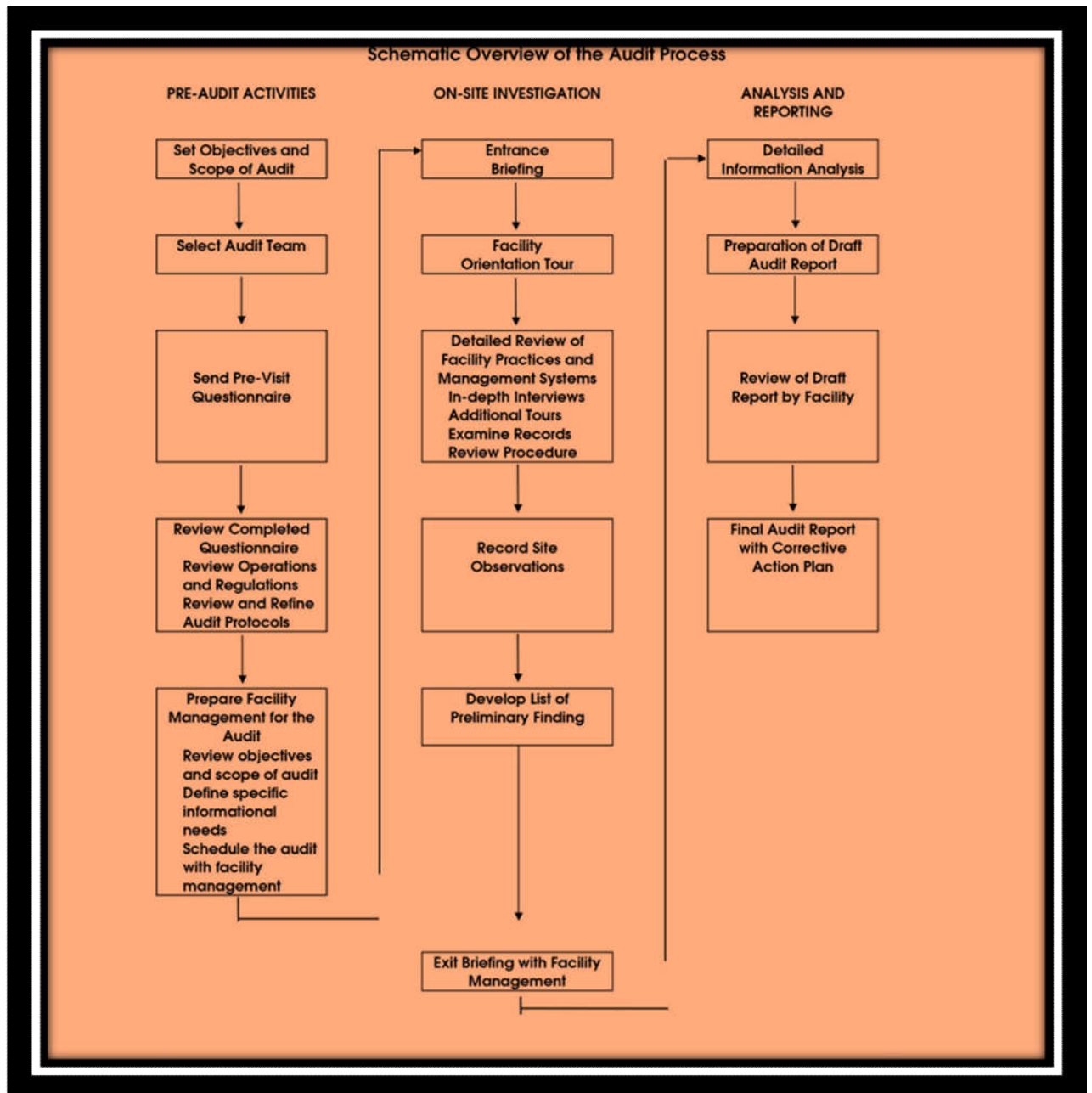


Fig 1.3: auditing process overview

## Auditing Tools

### Checklists

Checklists help ensure that different tasks or topics are included during the audit. They are very useful in specialized cases where a complex range of issues and questions need to be asked to ensure that nothing is missed.

One of the limitations of checklists is the tendency to rely on them too much and fail to look beyond the contents of the checklist to consider secondary questions and issues that may develop. If questions or check items have, for some reason, been omitted or forgotten, this could have a significant impact on the conclusions of the audit. It is for this reason that additional information needs to be used in support of checklists.

### Questionnaires (Audit Protocols)

Audit protocols or audit questionnaires provide the basis and structuring for most audits. They are based on checklists but are more complex and detailed. They sometimes include logistical information and data relating to the audit and the site being audited. When developing protocols, every effort should be made to avoid asking questions that can be answered by a simple “yes” or “no.” The purpose of questions in audit protocols is to lead to deeper questions in order to uncover additional information and encourage communication.

### Observation

Observation is a vital component of an auditing exercise. Observation is a disciplined activity that must be carried out in a very deliberate and controlled manner. Humans have a habit of seeing what they want to see, rather than the reality of a situation. It is tempting to check only one part of a scene or activity and assume that it is representative of the whole, rather than taking the time to check the entire area or process. Looking at something twice is important because it helps auditors check that the observations have been accurately noted, analyzed and recorded.

### Photographs

Photographs are another important auditing tool. However, in order to use them, the presence and use of a camera on the site must be formally approved before the audit begins.

### Drill-Down Sampling

**Drill-down sampling** refers to the process of investigating data as far back as possible to find the true original source of an issue – for example, going all the way back to the moment an employee incorrectly noted a meter reading which later led to an accident. It is necessary to drill down to information in a

number of situations to check whether a system is working and that the data being produced through the system's requirements are actually being produced, recorded and used. Generally, as more and more errors, faults and instances of non-conformance are found, the size and scope of the drill-down sampling is increased in order to determine whether the problems are of an isolated nature or reflect a larger system breakdown.

## Research

Background research is yet another useful tool for auditing. Being familiar with a company's operations, products, raw materials, press materials and so on provides a context for an audit and helps auditors to understand the facility and processes they are investigating.

## The Contents of an Audit Report

The contents of an audit report should include the following:

- **An executive summary**, which covers key findings, commentary, photographs, and a full list of all of the auditor's recommendations
- **The scope of the audit**, including the areas audited, the location of the site, and the focus of the audit
- **The date the audit was conducted**
- **A list of audit participants**
- **A detailed report** on topics covered in audit protocol
- **Conclusions and recommendations appendices**, which provide a copy of the audit protocol, as well as detailed information regarding photo logs and other supporting documentation

### Further Reading:

- ✓ *ISO 14001 Environmental Certification Step by Step: Revised Edition*, A J Edwards (2003)
- ✓ *Environmental Management Systems*, Christopher Sheldon, Mark Yoxon (2012)