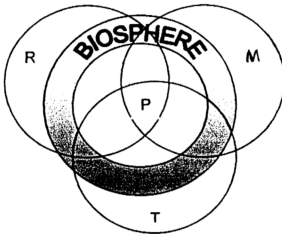


2. LITERATURE REVIEWS

2.1 Resources, Technology and Management

Products of modern society come from the application of technology to resources. The impact of this process on the biosphere depends on the quality of the management applied to effect this combination, as illustrated schematically in Figure 1.



$$\text{Products of society (P)} = \text{Resources (R)} \times \text{Technology (T)}$$

Figure1 Resources, Technology and Management Mix

Sometimes technology is blamed for pollution when in the fact the problem may arise from failure to take technology far enough. For example, primary sewage treatment may be provided where secondary or even tertiary treatment is desirable. In certain cases, there might be economic constraints and social constraints. However, the most usual constraint is an unwillingness, not an inability, to commit funds.

To reduce pollutants in industrial discharges to very low levels, most processes consume substantial amounts of energy. However, those pollutants created during the generation of energy are being produced at a greater rate than the primary pollutants are being eliminated by the application of the extra energy (Beale, 1980).

In order to illustrate the concept that pollutants are misplaced resources, attention is drawn to the materials balance systems described by Beale (1980) in Appendix 1. Inputs of resources are converted partly into goods and partly into residuals, i.e. potential pollutants. Most goods, after consumption, can also become residuals. Many outputs are discharged into the atmosphere in the form of gases from combustion of fossil fuels and animal respirations, and usually are not particularly harmful to natural systems. However, some of the remaining residual gases, dry solids and wet wastes tend to be potentially harmful.

The materials balance view highlights the fact that the throughput of resources necessary for a given level of production decreases with increases in efficiency of energy conversion, materials usage, re-use and recycling. This concept is directly influenced by technical, economic and environmental factors.

A product may sometimes be produced by dissimilar processes and therefore result in extremely different residuals reaching the environment. Selection of a preferred system from the viewpoint of its potential to pollute should include selection of those residuals for which all impacts are minimal. Therefore, the success of balancing the gains and losses in the materials balance concept will largely depend on the management of the company concerned.

2.2 Corporate Response to Sustainable Development

Companies are faced with the challenge of integrating environmental considerations into their production and marketing plans (Welford, 1996). There is always an incentive, however, for profit maximizing firms seeking short-term rewards to opt out and become free riders (assuming that everyone else will be environmentally conscious such that their own pollution will become negligible). However, environmental legislation is increasingly plugging the gaps which allow this to happen and firms attempting to hide their illegal pollution are now subject to severe penalties

(Welford, 1996). Even before such legislation comes into force, however, business should recognize that it is not only ethical to be environmentally friendly, but with the growth of consumer awareness in the environmental area, it will also be good business.

Firms clearly have a role to play in the development of substitutes for non-renewable resources and innovations that reduce waste and use energy more efficiently. They also have a role in processing those materials in a way, which brings about environmental improvements. For many products (e.g. cars and washing machine), the major area of environmental damage occurs in their usage. Firms often have the opportunity of reducing this damage at the design stage and when new products are being developed there is a whole new opportunity for considering both the use and disposal of the product.

Given the internal and external demands to improve the environmental performance of a company, those companies that achieve high standards of environmental performance will benefit in a number of ways. In order to realize this competitive advantage, Welford (1996) suggest that companies must seek to develop management strategies that will improve their environmental performance and address the environmental demands placed upon them by their stakeholders. By incorporating the increasing important environmental dimension into the decision making process of the firm, managers can seek to reduce costs and exploits the opportunities offered by increased public environmental concern within dynamic marketplace. Such a strategy must be proactive and honest. It may also involve a degree of education and campaigning. But more than anything, it must be ethical.

2.3 Environmental Management System

2.3.1 Introduction

Many organizations, having written their environmental policy and carried out an initial environmental review, find difficulty in translating recommendations into action. Sadgrove (1992) states:

... there is often a gap between what companies aspire to and what they achieve. Environmental affairs is a case in point: inaction is a great problem. There is a danger that once an environmental audit is executed and the policy written, little will follow... Companies which lack a management system will 'cherry' pick their environmental activities: a bit of recycling here, some landscaping there. It does not add up to comprehensive environmental management.

And Spedding, Jones and Dering (1993) come to a similar conclusion:

Reviews alone cannot provide an organization with the assurance that its performance not only meets but also continues to meet legislative and policy requirements.

One tool which organizations are using to facilitate implementation of environmental policy is an Environmental Management System (EMS), which meets the need of organizations identified by Roome (1992), of 'planned and programmed change to support environmental management'. An Environmental Management System is defined by the British Standards Institute (1994) as:

the organizational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy.

Similar definitions are found in the EU Eco-management and audit scheme and ISO 14000.

Welford (1996) suggests a strategic framework for environmental management in Appendix 2, which shows that before business can change to a 'sustainable business', it is essential that a strategic approach is taken towards the environment. To do this, first of all the staff at all levels of the organization should be involved. This can be achieved by creating environmental awareness and training. Secondly, the organization's culture should be changed and developed. Thirdly, cleaner and more efficient processes and technology should be developed. Finally, an organization should have a clean public image. A number of stakeholders, ranging from employees to the investors react favourably to this.

Gilbert (1993) provides a useful summary of the guidelines and basic principles of environmental management by organizations such as the International Chamber of Commerce, the Business Council for Sustainable Development and the Confederation of British Industry, which summarize the basic stages of an organization's EMS:

- a policy statement indicating commitment to environmental improvement and conservation and protection of natural resources;
- a set of plans and programmes to implement policy within and outside the organization;
- integration of these plans into day to day activities and into the organizational culture;
- the measurement, audit and review of the environmental management performance of the organization against the policy, plans and programmes;
- the provision of education and training to increase understanding of environmental issues within the organization; and
- the publication of information on the environmental performance of the organization.

Netherwood (1995) illustrates the stages of implementation of an EMS in the flow chart below (Figure 2). He suggests that the basis of all this activity is an organizational commitment to continual environmental management system.

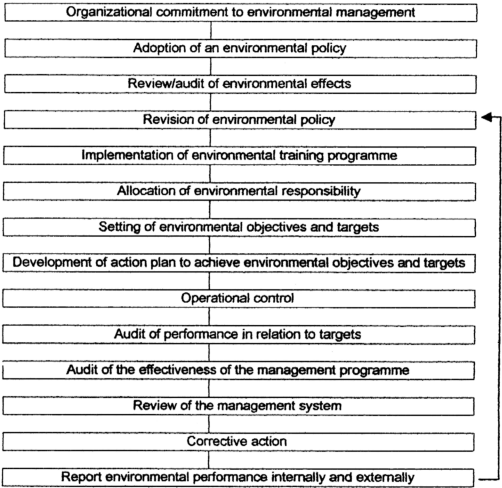


Figure 2 An Environmental Management System

2.3.2 Organizational Commitment to Environmental Management

The aims and priorities of all organizations differ, and the importance of the environment to those organizations will also vary. Despite these differences, according to Netherwood (1995), the most successful EMS will be found where senior management commitment exists, because

this facilitate the adoption of an environmental policy, and its subsequent translation into responsibility and action. This commitment should enable time, financial and other resources to be allocated to the environmental management process. However, in reality, many organizations find difficulty in ensuring this commitment, even when an environment policy already exists. This may due to the low priority of the environment when resources are allocated within the departments, existing management pressures, and cynicism and apathy towards environmental issues (Netherwood, 1995).

Ledgerwood, Street and Therivel (1992) suggest that environmental managers, or those attempting to initiate an EMS within an organization, need to market the environment as an issue to senior management, outlining ways in which an EMS will benefit the enterprise and in a sense providing training to senior management on the relevance of the environmental agenda. Welford and Gouldson (1993) suggest that this commitment needs to be periodically and continually reinforced to ensure that environmental issues are not marginalized over the long term. In many organizations, commitment to the environment and knowledge of environmental issues may already be present at a high level, and in these cases the adoption and implementation of environmental policy may be less problematic.

2.3.3 Environmental Policy

An environmental policy formally outlines an organization's commitments to environmental management. In many organizations a general policy is developed before any environmental management activity and revised once more information about effects and performance is available; in others, a policy is developed only after an environmental review (Netherwood, 1995).

Some policies take the form of a short statement, or a few bullet points, while others are lengthy policy documents specifying specific

objectives and targets. Sadgrove (1993) outlines some of the common issues covered by organizational environmental policy:

- the organization's attitude towards the environment;
- the overall environmental goals of the organization;
- commitment to the audit and review of the organization's environmental performance;
- commitment to meet and surpass environmentally standards;
- conservation of natural resources;
- minimization of the environmental effect of products, services and processes;
- commitment to provide a healthy workplace;
- commitment to liaise with the local community and society on environmental issues;
- commitment to train all staff and suppliers in environmental management; and
- specific commitments to areas such as energy, waste, land and water management.

However, achieving implementation of these commitments may be problematic, especially within those organizations which have not adequately thought of the practicality of their implementation, in terms of the resources required and in terms of the difficulty of their incorporation into the organization's management structure. Ketola (1993) argues that environmental policies are not always drafted in the best way or by the best possible people and that policies may reflect the concerns of the organization at the time that they were created, but may not lend themselves to day to day environmental management over a period of time. Therefore, it is important that the policy is achievable, realistic and easily understood by both employees at all levels within the organization, and the public. Gray (1993) suggests that the policy should raise difficult and challenging questions regarding the organization's environmental performance.

There has been increasing criticism of organization which develop environmental policies for marketing purposes (Netherwood, 1995). However, Netherwood (1995) argued that whatever the content of the policy, it should make an organization more publically accountable, and is an essential basis for environmental improvement, responsibility and action within the organization, no matter how limited or shallow the policy commitment are.

2.3.4 Environmental Review

An environmental review provides a snapshot of the environmental performance of the organization in term of the following types of issue; existing provision for environmental management, accident and emergency planning, communications, energy management, environment effects, investment, legislative requirements, local communities, nature conservation, processes, purchasing, products, resource consumption, suppliers, transport, waste minimization and water management (Netherwood, 1995). The data produced from the review should enable realistic policies and recommendations to be developed which are relevant to the particular issues, impacts and objectives of the organization.

Obviously, there is a great deal of variation in the content of environmental reviews depending upon the function, corporate ethics and culture of the organization. Some organizations may concentrate solely upon compliance issues and the way environmental issues affect the organization's economic performance, for example related to energy, water and waste management. Others may concentrate only upon direct effects to the environment, whereas others also consider service effects. The more proactive organizations may introduce the concept of ecological sustainability to this review stage, considering the organization's effect on global and development issues (Welford, 1993; Wheeler, 1994).

Many reviews use environmental SWOT analysis but generally the depth and scope of the review, the methodologies and analytical tools used and the range of recommendations resulting from the exercise differ from organization to organization.

Netherwood (1995) found that many organizations use external consultants to carry out the environmental review, although this can have negative consequences in terms of translation of the review's findings and recommendations into action. Generally, review are carried out by internal department staff directed by an environmental coordinator, manager or review team who analyze and report on the environmental effects of the organization. The review is a learning process for the organization and this internal approach can ensure a better understanding of environmental performance issues and how they can effectively managed.

2.3.4 Training

The successful of the EMS is very dependent upon training to encourage an understanding of the issues involved among employees, and to develop an understanding of their role and responsibilities within the greening process, as Roome (1992) suggests:

the improvement of managerial systems needs to recognize the value of building the belief and commitment of the workforce to an environmental policy.

To enable the change in organizational culture that is required for a successful EMS, training can play a key role in increasing people's awareness of environment issues, and achieving a certain level of understanding of issues such as energy and waste management techniques among all personnel. It is important that training takes place at all levels of the organization. It should include senior management who have key decisions to make on resourcing environmental

management, middle managers who are affected by environmental issues on a daily basis and other staff who have influence on the processes and practices of the organization which affect the environment.

Gilbert (1993) states that the establishment of an environmental training programme is essential in order to remove the suspicions about environmental management among personnel and to facilitate the change in management strategies necessary for environmental improvement. Netherwood (1995) found that in many organizations the area of most inertia regarding environmental management was middle management. This suggests that they should be targeted specifically to disseminate information and train their operational staff in environmental management techniques.

Other training methods include the use of external consultants, the skills of internal training units, workshops, videos and management manuals. The EMS is likely to function better if those involved feel that their contribution actually makes a difference, and that what they think about the organization's performance is fed back into the system and recognized.

Some organizations adopt voluntary environmental management training, while others find that compulsory training is necessary to involve employees in the EMS process. What must be considered in carrying out environmental training is the wide range of attitudes that will be present in the organization, and that the material should be pitched at the right level in terms of both understanding and radicality. Welford and Gouldson (1993) suggest that training should be an ongoing process and not just a one off exercise that is swiftly forgotten about by its participants. The training approach should continually reassert the importance of environmental issues to staff and affirm their own responsibilities to environmental management within the organization.

2.3.5 Allocation of Environmental Responsibility

Too often staff will deny responsibility for environmental issues. To ensure that the policy is implemented, clear management responsibilities need to be defined for all staff who is involved with the activities identified by the review as having environmental implications. According to Gilbert (1993) the ultimate aim should be the integration of environmental responsibilities into job description and performance measurement.

The definition and documentation the levels of authority associated with environmental management are also important at this stage of an EMS. The allocation of managerial authority enables the efficient resourcing and implementation of environmental management initiatives. For example, environmental managers may find that they have no power or authority to actually get things done without senior management approval, which seriously limits their effectiveness.

It is also important that there is some mechanism for ensuring that management is actually carrying out their environmental responsibilities. This can be done by defining a number of performance outputs derived from the responsibilities of each individual, for example the provision of documentation, or the provision of information to other staff, which will facilitate the later stages of the EMS concerning audit and review. If the allocation of responsibility is carried out effectively then there will be clear lines of communication and no gaps in the organizational structure, areas where Welford and Gouldson (1993) suggest that the EMS frequently break down.

2.3.6 The Setting and Attainment of Objectives and Targets

Organizations need to define, from the environmental review, a set of objectives and targets, which are realistic and attainable. They should be sufficiently short-term to be of some significance, and sufficiently long-term to enable effective measurement of environmental improvement.

British Standards Institute (1994) defines environmental targets as:

detailed performance requirements, quantified wherever practicable, applicable to the organization or parts thereof, that arise from the environmental objectives and that need to be set and met in order to achieve those activities.

Gilbert (1993) suggest that targets should be demanding in order to provide motivation, satisfaction and a sense of achievement when they are met. In practice it may be difficult to achieve this balance, however what Gilbert (1993) does suggest is that each individual concerned with environmental management throughout the organization should have a set of targets and goals to achieve. These can be set at workshops with representatives from every level of the organization, where all staff work together to work out what is achievable within a period of time, how this will be achieved, and how this will be measured and documented.

An action plan should be created to implement the review recommendations and to meet the objectives and targets. Gilbert (1993) suggests that implementation programme can be created during workshops to identify objectives and targets, and that programmes should be specific to departments. This programme should include:

- the identification of the environmental issue though the collection of appropriate information;
- the analysis of the issue to identify why it is a problem;

- the development of a solution to the problem;
- the implementation of the solution; and
- the review and documentation of the action taken.

2.3.7 Operation Control

Gilbert (1993) states that this part of EMS should include a set of practices, procedures and systems that ensure that all environmental management activities and the attainment of the relevant objectives and targets are carried out under controlled conditions. In other words operational control is the measurement and verification of whether what's meant to be getting done is getting done, and the correction of procedures if this is not the case.

Clear documentation should facilitate this. This documentation should also ideally introduce employees to the EMS, clarify their responsibilities, indicate which records are to be kept to date, and describe the procedures for carrying out environmental management activities. It should also facilitate training requirements, and provide the basis for the audit, review and evaluation of the EMS as well as provide an indicator to customers that the EMS is functioning properly. Netherwood (1995) found out that many organizations develop a management manual to cover all of these functions and requirements.

2.3.9. Audit of the Effectiveness of the Management Programme

This is regular and systematic evaluation of the EMS in terms of its efficiency in achieving objectives and targets. This audit is on an organization scale, looking at the organizational structure, environmental roles and responsibilities, the procedures to operate and administer environmental management, the activities and processes involved in environmental management, and the operating procedures and records which are being used to improve the environmental

performance of the organization. The audit can be carried out internally or externally, but in general requirement is that there is a degree of objectivity involved in the exercise, so the auditors will need to be independent of areas being audited within the organization. There can be problems with this stage, similar to those experienced during environmental reviews, in that there is a resistance to interference and a reluctance to be identified as an individual or department which is failing the organization. However, this stage of the EMS is not a managerial appraisal, but an appraisal of the EMS and its effectiveness in meeting organizational objectives, and implementing environmental policy.

2.3.10 Review of the Environmental Management System

This review, according to Gilbert (1993), should summarize the status of the EMS and current environmental performance, review internal and external pressures for change, and result in an action plan to facilitate further improvement in performance. To enable this the EMS review should include:

- the results of audits and assessments;
- progress of improvement;
- plans and programmes;
- action taken on non-compliance;
- overview of new and planned legislation;
- the performance of suppliers and partners;
- a review of public environmental issues;
- local community concerns;
- new environmental concerns; and
- conclusions and recommendations for amendment of the EMS.

A final report on the EMS would generally include the identification of gaps and the problems with the EMS, area where tighter control limits could be implemented, area where impacts could be reduced, the

amendment of environmental objectives and targets, a review of the structure, staffing, systems and training in the EMS, and a set of new objectives and targets which are to be implemented.

2.3.11 Environmental Reporting and Environmental Statements

In some companies, there is a genuine desire and feeling of responsibility to become more publically accountable regarding their environmental management practices. The EU eco-management and audit scheme (EMAS) facilitates this accountability as it requires that an environmental statement is published which is independently verified. The statement should include:

- a) a description of the environmental protection system
- b) a description of the auditing system
- c) a validated environmental statement including the details of activities concerned; environmental problems associated with activities; inventories of emissions, waste, energy, raw materials; the company's environmental policy, objective, programme and performance.

Obviously this requirement has great implications for the organization if it wishes to register with EMAS in terms of being objective and honest about its environmental performance. It could be suggested that many organizations will decide to use the BS7750 model for an EMS, which does not require a validated statement or report, rather than undertake this final stage of the EMS loop.

However, there has been a great deal of activity in environmental reporting in companies in recent years. Whereas this is an encouraging trend, the honesty, selectivity and objectivity of these reports have often been questioned. Netherwood (1995) also found out that many organizations publish information about their EMS, mainly for public relations purposes, in the form of an environmental report which can often be short on fact about the organization's environmental

shortcomings and concentrate on the organization's major environmental achievements.

2.4 Common Organizational Factors Which Affect Environmental Development

Roome (1992) suggest that one of the main constraints on a successful environmental management strategy is 'the misjudging or mishandling of the process of organizational change'. Indeed, there are a number of factors which influence the development of an effective EMS within organizations, but Netherwood (1995) suggests there are also factors which can benefit or more commonly hinder the development of an EMS, that may not be the result of inadequate planning but the result of economic and political factors and attitudes and culture inherent within the organizations. For example, the commitment of adequate resources to an EMS may be hindered due to the failure of middle and senior management to perceive the environment as being worthy of resource allocation in its own right rather than an add-on component of TQM systems, or a cheap marketing tool. When it becomes apparent that the environment will cost money within the organization, commitment can be swiftly withdrawn, policies can remain unfulfilled and promising environmental management initiatives can be curtailed. The EMS may also suffer from inertia resulting from stifling management practices, which affect all areas, not just environmental management. This inertia may be exacerbated by the fact the environment is a new area and many middle and senior managers are averse to change, especially if this will add to their responsibilities.

Netherwood (1995) also suggested that EMS and the standards will just add another layer of bureaucracy for the organization and put even grater pressure on limited management time, and that this will result in the relegation of priorities. Netherwood (1995) found out that both internal and external economic influences can have negative effects upon the initiation, development and resourcing of an EMS. At a corporate level, the

commitments made in an environmental policy may be the first to be sacrificed if there is an increased pressure on limited resources. The EMS can very often be based upon ad hoc financial and staffing arrangements especially in organizations, which see the environment as a short-term trend. This can lead to inadequate resourcing of the EMS and consequently, low morale and apathy among those involved in the environmental management process. Subsequently the EMS process fails in a particular department or on a larger scale throughout the organization it will much more difficult to resurrect at a later stage when resources may become available.

Many of the larger organizations, which have a considerable number of departments, staff, sites and functions may have a great deal of difficulty in coordinating an EMS. There may be a multi-speed system of environmental management within some organizations, with fragmented implementation both upwards and sideways through the management structure, leading to difficulties in managing both the resources and inter-departmental politics, and difficulties in developing a corporate approach to environmental performance measurement. Netherwood (1995) also found that the EMS may also suffer as a result of organizational restructuring or the promotion of other 'higher priority' programmes such as customer care initiatives, so that the environment gets pushed down the management agenda.

McCallum and Federicks (1998) found that one task area that has proven to be particularly problematic for those implementing an EMS is identifying significant environmental aspects and establishing corresponding business priorities. Others include evaluation of environmental (local, regional and global) impacts, maintaining the integrity of the Environmental Management System and development of training and communication aspects of the system.

There can be great deal of entrenched cynicism towards environmental issues within organizations which even effective management and

mandatory environmental training will not affect. Netherwood (1995) argued that organizations can act as a microsm of society, where long-term environmental gains are sacrificed for short-term economic advantage and where there is a great deal of apathy towards environmental issues. Despite the need for cultural change within organizations to implement effective environmental management, it could be too much to ask of the EMS process and training to achieve a shift in corporate culture, as it can only go so far in changing the thought processes of each individual and may only achieve limited change in people's values in working towards a common environmental goal. Similarly, Tibor (1996) feels that the biggest obstacle is to change the business culture of the companies themselves, in the way business was perceived.

Obviously there will be more specific organizational barriers to EMS within different types of organization in different sectors, and there will be alternative solutions to these problems based upon political, economic, structural and individual factors.

2.5 Criticisms of Environmental Management Systems and Environmental Standards

Besides the organizational factors which can limit the effectiveness of EMS there are also problems with the EMS process and the environmental standards, if their ultimate goal is to mitigate environmental impacts and achieve sustainable practices within organizations. Sadgrove (1992) states that organization sets its own environmental objectives and targets for improvement it can improve its environmental performance as little or as much, as fast or slow as it likes. Shayler ,Welford and Shayler (1994) suggest that the targets an organization sets itself through an EMS might represent ' environmental tokenism rather than a solid commitment to decreasing environmental impact'. Therefore a self-regulated EMS does not guarantee significant improvements in performance, so in

environmental terms it could be argued that EMSs are fundamentally flawed.

Spedding, Jones and Dering (1993) and Welford (1993) point out similarly, that there is a tendency for organizations to concentrate in satisfying the environmental management programme that is concerned mainly by the audit of the system rather than auditing environmental performance. Roome (1992) and Welford (1993) suggest that the same thing will happen to environmental standards that has happened to quality standards, i.e. the environment will be forgotten about once the standard is achieved.

The EMS standards do not set specific limits upon energy or resource consumption, levels of emissions, or levels of performance, other than those based on national compliance, nor there is a requirement within their framework to tackle all of the organization's environmental effects. EMS and the standards only require a commitment to continual environmental improvement through the management system loop and do not aim for environmental protection. As Shayler, Welford and Shayler (1994) state with respect to BS7750:

the only requirement seems to be to demonstrate a capability for marginal environmental improvements within a self-determined framework of policies, targets, systems and assessment technologies.

The EMS is seen in many sectors as being too bureaucratic, and there has also been criticism regarding the potential benefits of registering with the standards, and whether they will outweigh the costs. Netherwood (1995) found that organizations are put off the development of an EMS after the policy and review stages because of the financial costs and time involved, and because the significant documentation requirements involved in the standards.

There is no doubt that many organizations will find the EMS standards useful as a motivating factor and as a framework to initiate environmental

management and many see them as a toolbox to facilitate this.

Netherwood (1995) argued that organizations will use the environmental standards as a marketing device, and as a smokescreen to pacify concerns regarding environmental performance, instead of as a catalyst for cultural change within the organization in order to provide real and significant improvements in environmental performance.

2.6 Standardization of the Environmental Standards

Environmental standards such as British Standard for Environmental Management Systems BS7750 (1994), the EU Eco-management and audit scheme (EMAS, 1993) and the international standard ISO 14000 have been developed to provide organizations with a framework to implement an EMS within their organization and these standards are based upon the principles of TQM.

Why have these new standards? They form a set of international standards that brings a worldwide focus to the environment, encouraging a cleaner, safer, healthier world for us all. The existence of the standards allows organizations to focus environmental efforts against internationally accepted criteria.

At present many countries and regional groupings are generating their own requirements for environmental issues, and these vary between the groups. A single standard will ensure that there are no conflicts between regional interpretations of good environmental practice.

The broad aims of standardization (BSI, 1991) can be summarized as follows:

- a) to promote the quality of products, processes and services by defining those features and characteristics that govern their ability to satisfy given needs;

- b) to promote improvement in the quality of life, safety, health and protection of the environment;
- c) to promote economic use of materials, energy and human resources in the production and exchange of goods;
- d) to promote clear and unambiguous communication between all interested parties, in a form suitable for reference or quotation in legally binding documents;
- e) to promote international trade by the removal of barriers caused by differences in national practices; and
- f) to promote industrial efficiency through variety controls

In this study we shall focus only on the international standard ISO 14000 particularly ISO 14001.

2.7 ISO 14000

2.7.1 Background

The ISO 14000 series, a project of the International Organization for Standardization (ISO), is a collection of voluntary consensus standards that have been developed to assist organizations to achieve environmental and economic gains through the implementation of effective environmental management systems.

2.7.2 ISO 14000 Development History (Quality Network, 1996)

The ISO 14000 series emerged primarily as a result of the Uruguay round of the GATT negotiations and the Rio Summit on the Environment held in 1992. While GATT concentrates on the need to reduce non-tariff barriers to trade, the Rio Summit generated a commitment to protection of the environment across the world. The environmental field has seen a steady growth of national and regional standards. The British Standards Institution has BS 7750, the Canadian Standards Association has

environmental management, auditing, Eco-labeling and other standards, the European Union has all of these plus the Eco-management and audit regulations, and many other countries (e.g. USA, Germany and Japan) have introduced Eco-labeling programs.

After the rapid acceptance of ISO 9000, and the increase of environmental standards around the world, ISO assessed the need for international environmental management standards. They formed the Strategic Advisory Group on the Environment (SAGE) in 1991, to consider whether such standards could serve to promote a common approach to environmental management similar to quality management; enhance organizations' ability to attain and measure improvements in environmental performance; and facilitate trade and remove trade barriers.

In 1992, SAGE's recommendations created a new committee, TC 207, for international environmental management standards. The committee and its sub-committees include representatives from industry, standards organizations, government and environmental organizations from many countries.

2.7.3 ISO 14000 Standards

ISO 14000 Series cover the following standards:

Standard: Title / Description

14000: Guide to Environmental Management Principles, Systems and Supporting Techniques

14001: Environmental Management Systems - Specification with Guidance for Use

14010: Guidelines for Environmental Auditing - General Principles of Environmental Auditing

14011: Guidelines for Environmental Auditing – Audit Procedures-Part 1: Auditing of Environmental Management Systems

14012: Guidelines for Environmental Auditing – Qualification Criteria for Environmental Auditors

14013/15: Guidelines for Environmental Auditing - Audit Programmes, Reviews & Assessments

14020/23: Environmental Labeling

14024: Environmental Labeling - Practitioner Programs – Guiding Principles, Practices and Certification Procedures of Multiple Criteria Programs

14031/32: Guidelines on Environmental Performance Evaluation

14040/43: Life Cycle Assessment General Principles and Practices

14050: Glossary

14060: Guide for the Inclusion of Environmental Aspects in Product Standards

2.7.4 ISO 14001

Overall structure of ISO 14001 standard has been constructed around the Deming Cycle, a process management tool devised by Dr W Edwards Deming, a pioneer in the field of quality management. The Deming Cycle is shown in Figure 3.

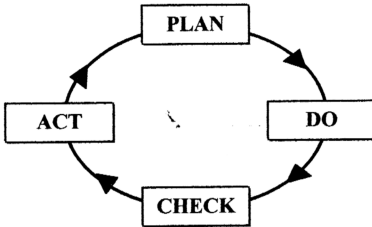


Figure 3 The Deming Cycle

Plan refers to planning what is to be done

Do refers to doing what has been planned

Check refers to checking that what was planned has actually been done

Act refers to acting on the results of the checking procedure to revise the initial plans

Appendix 3 shows how the clauses of ISO 14001 have been ordered so that they correspond with the four stages of the Deming Cycle.

International standard ISO 14001 specifies requirements for an EMS to enable an organization to formulate a policy and objectives taking into account legislative requirements and information about significant environmental impacts. It applies to those environmental aspects, which the organization can control and over which it can be expected to have an influence. However, it not itself states specific environmental performance criteria. The requirements of ISO 14001, in general, are discussed below.

ISO14001 requires an Environmental Policy to be in existence within the organization, fully supported by senior management, and outlining the policies of the company, not only to the staff but to the public. The policy needs to clarify compliance with Environmental Legislation that may effect the organization and stress a commitment to continuous

improvement. Emphasis has been placed on policy as this provides the direction for the remainder of the Management System.

Those companies who have witnessed ISO 9000 assessments will know that the policy is frequently discussed during the assessment, many staff are asked if they understand or are aware of the policy, and any problems associated with the policy are seldom serious. The Environmental Policy is different; this provides the initial foundation and direction for the Management System and will be more stringently reviewed than a similar ISO 9000 policy. The statement must be publicized in non-technical language so that it can be understood by the majority of readers. It should relate to the sites within the organization encompassed by the Management System, it should provide an overview of the company's activities on the site and a description of those activities, a clear picture of the company's operations.

The preparatory review and definition of the organization's environmental effects is not part of a ISO 14001 assessment, however examination of this data will provide an external audit with a wealth of information on the methods adopted by the company. The preparatory review itself should be comprehensive in consideration of input processes and output at the site. This review should be designed to identify all relevant environmental aspects that may arise from existence on the site. These may relate to current operations, they may relate to future, perhaps even unplanned future activities, and they will certainly relate to the activities performed on site in the past (e.g. contamination of land).

The initial or preparatory review will also include a wide-ranging consideration of the legislation that may effect the site, whether it is currently being complied with, and perhaps even whether copies of the legislation are available. Many of the environmental assessments undertaken already have highlighted that companies are often unaware

of all of the legislation that affects them, and being unaware, are often not meeting the requirements of that legislation.

The company will declare its primary environmental objectives, those that can have most environmental impact. In order to gain most benefit these will become the primary areas of consideration within the improvement process, and the company's environmental program. The programme will be the plan to achieve specific goals or targets along the route to a specific goal and describe the means to reach those objectives such that they are real and achievable. The Environmental Management System provides further detail on the environmental programme. The EMS establishes procedures, work instructions and controls to ensure that implementation of the policy and achievement of the targets can become a reality.

Communication is a vital factor, enabling people in the organization to be aware of their responsibilities, aware of the objectives of the scheme, and able to contribute to its success. As with ISO 9000 the Environmental Management System requires a planned comprehensive periodic audit of the Environmental Management System to ensure that it is effective in operation, is meeting specified goals, and the system continues to perform in accordance with relevant regulations and standards. The audits are designed to provide additional information in order to exercise effective management of the system, providing information on practices that differ to the current procedures or offer an opportunity for improvement.

In addition to audit, there is a requirement for Management Review of the system to ensure that it is suitable (for the organization and the objectives) and effective in operation. The management review is the ideal forum to make decisions on how to improve for the future.

2.8 Are International Standards Barriers to Trade?

Many companies around the world still see standards as restrictive and imposing potential trade barriers (Goodman and Veritas, 1998). The intention of International Standards is not, however, to introduce more trade barriers, but to overcome trade barriers which currently exist as a result of the current diversity of national standards.

The benefits of an internationally accepted standard can clearly be seen. Successful tendering in international competitive bidding means conforming to the specifications and standards included in the terms and conditions. International standards, therefore, guarantee equal opportunity for tenderers in principle (Wilson, 1997; Goodman and Veritas, 1998).

2.9 Why the concern for ISO 14001 or an Environmental Management System?

For many companies, conformance to ISO 14001 may become a contractual requirement of customers in both the U.S. and the European Community (EC) (Capaccio Environmental. Engineering(CEE) 1996) . Also, because ISO 14001 is a continuation of the ISO 9000 Product Quality standards, it is expected that ISO 14001 will eventually become a requirement for attaining ISO 9000 re-certification. Thus, many companies are setting goals to establish environmental management systems that conform to ISO 14001 guidelines in order to remain competitive in the global marketplace.

For those companies who have already obtained ISO 9001 registration and/or follow Total Quality Management (TQM) system principles, the ISO 14001 registration is a logical next step because it is very similar to ISO 9000 system and the principles of TQM. In addition to the product marketing benefits of obtaining ISO 14001 registration, the U.S. Environmental Protection Agency (EPA) is currently considering regulatory

incentives under its Common Sense Initiative (CSI) program to benefit companies certified to ISO 14001.

Many environmental regulations have been developed; however, these are external laws that change, making it difficult for a company to remain current. A complimentary method for achieving environmental protection is to use internal standards. This enables a company to integrate quality management systems within their business operations without relying solely on external laws. On top of that, a single standard will ensure that there are no conflicts between regional interpretations of good environmental practice. Author Tim Tibor (1996) mentioned that the pace of development of ISO 14000 standards is due to growing proliferation of environmental management standards and voluntary initiatives.

Environmentally friendly products, if they meet consumer needs, have an advantage over their "non-friendly" competitors (Tibor, 1996; CEE, 1996). Under ISO 14000, the goal is to define standards for environmental labeling. Europe is leading the world; the EC adapted an Eco-label regulation in 1992. This voluntary regulation encourages manufacturers to reduce the environmental impact of their products, and inform consumers about the environmental performance of their products. At the present time, this label is targeted for detergents, painting, and paper products. The framework of the Eco-label scheme is likely to be adapted for ISO 14000. Companies are already planning to identify their products through the label scheme and obtaining an advantage over non-labeled competitors. It should be assumed that European firms would pursue this avenue for attracting customers.

The ISO 14001 Standard is also used as the foundation of an internal risk control program, helping to ensure that environmental issues are considered strategically, rather than as a one-off special exercise. Environmental management is no longer something extra which organizations need to do for moral or corporate responsibility reasons but it forms part of every company's business strategy to help achieve that

competitive edge. With stricter enforcement of environmental legislation, coupled with heightened awareness of customers and stakeholders about the potential risks associated with environmental liabilities, many companies are looking into legal, financial and commercial risks associated with environmental performance.

2.10 Environmental & Business Benefits of ISO 14001

Some of the benefits of implementing an Environmental Management System in accordance with the ISO14000 standards, include: identifying areas for reduction in energy and other resource consumption, reducing environmental liability and risk, helping to maintain consistent compliance with legislative & regulatory requirements, benefiting from regulatory incentives that reward companies showing environmental leadership through certified compliance with an internationally recognized Environmental Management System standard, preventing pollution and reducing waste, responding to pressure from customers and shareholders, improving community goodwill, profiting in the market for "green" products, respond to insurance company pressure for proof of good management before pollution-incident coverage is issued, and demonstrating commitment to high-quality (Kinsella, 1994; CEE, 1996).

According to author Tim Tibor (1996), other benefits include satisfying stakeholder interests and reduce multiplicity/duplications. Authors, Sally Goodman and Det Norske Veritas (1998) added that Environmental Management System motivates employees, improve management change in supply and enhance the company image. They and author Ron Quigley (1997) agree that ISO 14001 will increasingly, become a selling point providing a competitive edge for organizations that sell goods or services on the global market. On the other hand, President and CEO of International Institute for Sustainable Development (IISD), Arthur J. Hanson said it helps companies to focus on environmental issues and bring them into the main stream of corporate decision-making.