1 Basics of Environmental Management Systems

1.1. The Development of Environmental Management

1.1.1. What is Environmental Management and an Environmental Management System?

Environmental management is management of an organisation's activities that have or can have an impact on the environment.

Figure 1.1 shows the evolution of environmental management since the wave of environmental awareness in the early 1960s. The figure illustrates the short history of the current concept of environmental management.

An EMS is a continuous cycle of planning, implementing, reviewing and improving the processes and actions that an organisation undertakes to meet its environmental targets and requirements. It is a system to comply with the requirements of international standards such as ISO 14001 and EMAS. The definition of an EMS used by ISO 14001 is:

"The part of the overall management system that includes organisational structures, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing achieving, reviewing and maintaining the environmental policy" [European Committee for Standardization, 1996-08-21, section 3.5].

An EMS thus manages the environmental impacts of an organisation. The expected outcome is continuous improvement in environmental management.

Due to the fact that ISO EMS standards are intended to be applicable in many or even all parts of the world, they are kept very general. Organisations that implement an EMS can thus adapt their EMS exactly to their needs. Organisations that do not have significant environmental impacts themselves may focus their EMS on the environmental performance of suppliers, while organisations with significant environmental impacts may focus on operating more environmentally friendly.

This great flexibility means that two different EMSs can not be compared, though they both have to meet the requirements set by the standard setting organisation. An outside observer must be able to understand what an EMS is trying to achieve. Certification of an EMS means that the organisational

Main Contents of this Chapter

- What an EMS is.
- Why establishing an EMS is a good investment.
- How an EMS can improve an organisation's overall performance.
- The costs of an EMS.
- Why it will become more and more important for organisations in the Baltic Sea region to have an EMS.
- EMS and quality management.
- EMS and risk management.

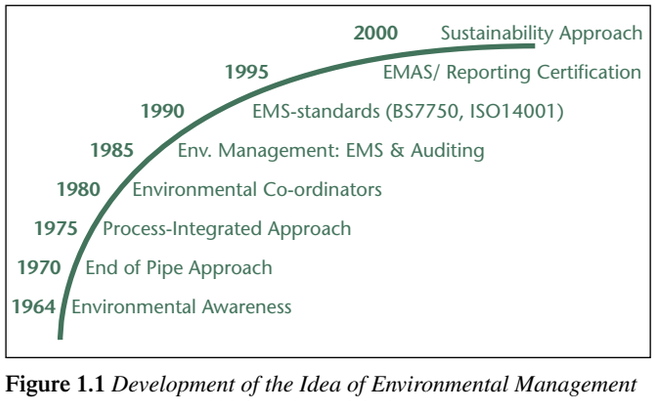

Figure 1.1 *Development of the Idea of Environmental Management [UNEP/ICC/FIDIC, 1996, p. 4 (modified)].*

structures required have been established and that the EMS is designed to achieve continuous improvement.

ISO 14001 requires organisations to commit themselves to compliance with applicable environmental legislation. As environmental legislation differs widely from country to country, there is a range in level of difficulty to achieve national environmental compliance. This is not as much a problem with EMAS as it is applied in a more homogenous economic area with the same environmental laws applicable.

1.1.2. Why Establish an EMS?

The challenge of responding to the ISO 14001 EMS standard is on the agenda of organisations in both the public and private sectors and their environmental stakeholders. Customers, governments, communities, public interest groups and others may ask for ISO 14001 or EMAS certification to ensure that the organisation's environmental responsibilities are being managed in an organised and serious way. However, developing an EMS that meets the ISO 14001 or EMAS requirements is a very ambitious undertaking, and obtaining certification of an EMS requires additional effort and cost – especially if an outside registrar audits the EMS and verifies that it meets the requirements.

Both the ISO 14001 EMS standard and EMAS only specify the structure of an EMS. The content is up to the organisation itself. The organisation decides what it wants to do, and the EMS organises the tasks necessary. Operating costs can only be reduced and environmental risks minimized if the organisation focuses the EMS on specific operational practices. The objectives for improvement are set by the organisation itself.

There are many organisations that are subject to environmental regulations without being aware of it. It can be said that basically any organisation irrespective of its size or sector which causes any kind of impact on the environment, such as the production of waste or emissions into the air, may be subject to environmental regulations.

At first glance, most organisations that are subject to environmental regulations may not seem to be so at all. However, restaurants, medical offices, auto repair companies, bakeries, supermarkets, copy shops, etc., may all be affected by environmental regulations. There are of course many variations and exemptions to environmental regulations, but often it is best to start developing an EMS as soon as possible to avoid the costs of possible non-compliance. A great problem in this context is the complexity of environmental legislation, which may confuse affected organisations. This is a problem for Eastern European countries joining the EU, as European environmental legislation is quite complex. Thus, the EMS of many organisations in Eastern Europe may have to give particular attention to maintaining compliance. This is not as costly as is often claimed. On the contrary, there may be significant benefits [Forbes, 1999].

Many people view environmental compliance as an additional cost that reduces profit. It is true that environmental compliance can be costly in the beginning. However, there is a wide variety of programmes that can be introduced to minimize this effect, e.g. waste reduction may result in significantly lowered disposal costs. In some countries, good environmental compliance gives tax breaks and exemption from certain environmental regulations. The "image" effect should also always be kept in mind. A good public image is often worth much more than the cost of compliance. Good environmental performance can be used for advertising purposes, as "green" organisations are very popular with consumers and stakeholders.

EMS consultant S. Forbes [1999] wrote that:

"There are unfounded fears which inhibit many organisations from inquiring into their regulatory status, or contacting the regulatory agency for assistance. In fact, the environmental regulatory agency usually will cooperate and assist the sincere organisation to achieve compliance, as best as they can."

Though most regulatory agencies are allowed to take action against organisations who are not in compliance, this is seldom experienced by organisations who are known to be seeking environmental compliance. According to Forbes [1999]:

"Enforcement action is generally reserved for those facilities which make no effort to comply after repeated warnings and notifications."

Briefly, an EMS is a systematic approach for an organisation to achieve environmental and other organisational goals. Since organisations of all kinds increasingly want to achieve and demonstrate sound environmental performance, an EMS can help to comply with environmental laws and regulations as well as with expectations from customers and other stakeholders. It can combine an organisation's organisational goals with its environmental goals and enable environmental obligations to be managed effectively. Furthermore, an EMS can manage potential liabilities by systematically identifying risks and avoiding environmental and financial damages.

An EMS has two core goals: pollution prevention and compliance with environmental regulations. Other ways of achieving these goals are not addressed here. Very few organisations reach these goals without using an EMS.

National Sanitation Foundation (NSF) International, a US based non-governmental organisation, wrote that if an organisation answers yes to one or more of the following questions, it can benefit from an EMS [NSF International, 2001, p. 4.]:

- Is your organisation required to comply with environmental laws and regulations?

- Are you looking for ways to improve your environmental performance?
- Is the state of your organisation's environmental affairs a significant liability?
- Does a lack of time or resources prevent your organisation from managing its environmental obligations effectively?
- Is the relationship between your organisation's environmental goals and other goals unclear?

1.1.3. Benefits of an EMS

As most organisations implementing an EMS seek monetary benefits, a main concern is always: is an EMS an investment or just a cost? The answer depends on the approach taken and on the goals set. B. Hamner, Professor at Universidad de Pacifico in, Lima, Peru and expert on cleaner production wrote [1997]:

"If the ISO EMS is focused on compliance assurance, it will be an expense for those whose major benefit will be potential liability reductions. In developing countries where recognition of the business benefits of improved environmental performance is very low, this compliance-focused approach appears to be the dominant one. If the system is focused on improved production processes and product designs, then it can significantly prevent pollution, reduce operating costs and potential liabilities, and also increase customer satisfaction and market share."

In the more industrialized countries, many organisations have come to realize that ISO 14001 can be a useful tool to move beyond compliance. In any case, the more complex an EMS grows the more expensive and time-consuming it becomes.

Some of the numerous benefits of an EMS, listed by NSF International [2001, p. 7] are:

- Improved environmental performance.
- Enhanced compliance.
- Prevention of pollution.
- Resource conservation.
- New customers/markets.
- Increased efficiency/reduced costs.
- Enhanced employee morale.
- Enhanced image with the public, regulators, lenders, investors; i.e. stakeholders.
- Employee awareness of environmental issues and responsibilities.
- Reduced liabilities.
- Competitive advantages.
- Fewer accidents.

More examples of benefits of an EMS can be found in the case studies.

1.2 The Economy of EMS

1.2.1. Does an EMS Reduce the Cost of Regulation?

An important concern is the extend to which EMSs can reduce the cost of regulation, in both macro-economic terms and the cost of compliance for each individual organisation. In many countries there is a discussion about whether or not ISO 14001 or EMAS registration can replace certain statutory reporting requirements, especially in those countries where regulatory requirements are extensive and are a burden on industry. A study by the World Bank [1998, p. 163] found that:

"It is now clear that an EMS is not a substitute for a regulatory framework, but the monitoring and reporting systems of a well managed enterprise might substitute for some of the statutory inspections, audits and reports normally required under government regulations. The issue is when and how the government can trust the capabilities and commitment of an enterprise to self-monitor its environmental performance and whether some formal EMS and certification system, such as ISO 14001, would provide the mechanism to convince the regulators that scarce government resources were better used elsewhere in pursuing less co-operative organisations."

Even though there are few studies that prove the benefits of an EMS, there are indications that a well implemented EMS almost always improves profits and resource efficiency and reduces the amount of waste and pollution produced. Other aspects that are hard to measure, such as increased organisational transparency, teamwork among the employees or employee identification, are also often a result of successful EMS implementation. It is important to be aware that implementing an EMS is a labour-intensive process and that it may not result in financial gain, though it does in most cases. Therefore, the costs involved in implementing an EMS need to be carefully examined.

1.2.2. Potential Costs of an EMS

Generally, the costs of implementation depend on the scale and nature of an organisation's environmental impacts, on the existence and stage of development of environmental management in the organisation, and on the speed at which implementation is undertaken. It is possible to distinguish between both internal and external costs caused by implementing an EMS. Internal labour costs, for both managers and other employees, are the greatest cost for most organisations [NSF International, 2001, p. 7].

External costs mainly occur during the process of implementation of an EMS and possibly also on further external coaching of the improvement process after certification. These external costs include:

- Outside staff training.
- Consultant fees.
- In-house training and specialized training costs.
- Certification costs.
- Internal manpower costs.
- Investment costs for improving environmental performance (depending on the objectives set up in an environmental management programme).

Usually the implementation of an EMS results in more benefits than costs. In any case, in order to help prevent unpleasant surprises, the potential costs of implementation need to be evaluated before the process starts.

An EMS often builds on existing production or quality management systems. When such systems are weak, ineffective or simply do not exist (which is often the case in organisations which have poor environmental performance), then there is a need to establish a better management framework before focusing on the details of the EMS.

1.3. Implementing EMS in Eastern Europe

1.3.1. Why Implement EMSs in the Baltic Sea Region?

In the wake of economic improvement in the Baltic Sea region more and more environmental laws and regulations are being established to combat pollution and improve the environment. The increasing fines and taxes on pollution and waste demand the introduction of EMSs in industry. Waste management and cleaner production are therefore main concerns of the Baltic countries, and EMSs can help.

Reduction of pollution in the Baltic Sea region also plays a major role in the process of European Union (EU) integration. The Baltic countries have to comply with strict EU regulations and directives as members of the EU. As well, since many Western organisations have implemented EMSs, certification of organisations in the Baltic Sea region is essential for extensive cooperation. (Compare case studies 1 and 2 from countries in the Baltic Sea region.)

1.3.2. Consequences for International Trade

There has been considerable discussion about the extent to which ISO 14001 certification can help developing countries to become more involved in international trade with industrialized countries. Some say ISO 14001 widens the gap between developed and developing countries, as it is mostly developed countries who support implementation of EMSs according to ISO 14001. Others say that adoption of ISO 14001 will on the contrary help developing countries gain an competitive edge [World Bank, 1998, p. 164].

In recent years there has been a shift in attitude about ISO 14001. Many major national and international organisations (e. g. the major car manufacturers in the US and Europe) now either recommend or require their suppliers to be certified according to ISO 14001.With this type of market pressure these major organisations try to promote both their reputation as well as their environmental performance. Overall world-wide environmental performance can improve as many of the elements of the ISO 14000 series of standards address product design and production process issues. These issues are areas of considerable environmental importance, though are not regulated by trade law nor other international regulations. On the other hand, these requirements of course represent a market barrier which many small organisations or companies from developing countries may not be able to overcome, due to the costs of implementation and certification of an EMS.

Morrison, et al. from the US Pacific Institute for Studies in Development, Environment, and Security [2000, p. 4] wrote:

"While the ISO 14000 series will not be mandated by international law, conformity to it may become a de facto requirement for doing business, as has happened with the ISO 9000 quality management series in some industries. The increasing number of multi-national corporations that are 'encourag-

Figure 1.2 *Map of the Baltic Sea Region.*

ing' their suppliers to become ISO 14001 certified suggests a similar trend. Small firms in developed and less developed countries may face disproportionate costs, technical hurdles, and infrastructure difficulties, precluding implementation and third-party certification to ISO 14001."

Today, it is often multinational organisations that pressure their suppliers in developing countries or countries on the threshold to being industrialized (such as Chile or many Eastern European countries), to apply environmental standards such as ISO 14001. This is being done in order to improve performance in certain business areas. The certification according to ISO 14001 is in these cases usually a long-term goal, as multinationals more and more desire cooperative long-term relationships with their suppliers.

The World Bank [1998, p. 164] found that:

"Nevertheless, even if ISO 14001 is not likely to be a contractual constraint in the foreseeable future, environmental performance is increasingly becoming a factor in commercial transactions and organisations looking to establish a presence in the international marketplace are considering whether a 'green badge' would be an advantage to them. In practice, it is often marketing concerns rather than environmental ones which drive the ISO certification process."

In the recent past there has been an increased interest in Eastern Europe in EMAS and especially ISO 14001. Many of the new and future EU member states have translated and adopted the standards (See Internet Resources: EMAS – Accession countries.) Nevertheless, there is huge pressure on many organisations to comply with environmental legislation and other requirements. Such compliance requires large investments for some out-of-date industries, and in some cases presents the opportunity to implement ISO 14001 on a wide scale. Proper planning can decrease pollution and increase production efficiency.

1.3.3. Barriers for EMS Implementation in Eastern Europe

At present there are very few EMS experts in Eastern Europe. At the same time, the need for experts who can assist organisations in the EMS implementation process is growing and most organisations in Eastern Europe cannot afford to hire experts from other EU member states or elsewhere.

Another major problem is the lack of national accreditation in Eastern European countries. The result is that certification is conducted by expensive certification bodies from the UK or Germany. Furthermore, M. Gelber [1998], noted that in Eastern Europe:

"The organisational culture is generally very hierarchical and top down. For ISO 14001 and EMAS to be efficient as value-added systems they rely on a living and open organisational structure."

Even though the level of awareness in Eastern European regulatory bodies seems to be quite low, they have been promoting ISO 14001 and EMAS. The problem seems to be with the organisations themselves as they seem to be reluctant to implement EMSs, either because they think ISO 14001 and EMAS require an unattainable level of environmental performance, or because it is too much effort to produce the necessary documentation. These fears need to be overcome to increase the extend to which EMSs are implemented.

M. Gelber [1998] wrote that:

"ISO 14001 and EMAS are based on people making use of a system's framework to steer the environmental performance of an organisation in a planned way. Human resources based efforts, such as training, awareness and communication will be a cost-efficient way for Eastern Europe to achieve a higher level of environmental performance in certain areas. Therefore, practices such as prevention of pollution will save money by avoiding the necessity of investing in end-of-pipe technology."

1.4. Principles of an EMS

What is quality? How does it relate to an EMS? Is all EMS information based on serious research? These are questions that are being asked frequently in the ever changing world of EMS. An attempt is made at answering these questions in the following section.

1.4.1. The Deming Cycle as the Main Principle of an EMS

To improve environmental management, an organisation needs to focus not only on what happens but also on why it happens. Over time, the systematic identification and correction of system deficiencies leads to better environmental and overall organisational performance.

Most EMS models (including the ISO 14001 standard, which is explained in detail later) are built on the so-called "Plan, Do, Check, Act" quality management model introduced by Deming in the US in the 1950s. This model puts great emphasis on the concept of continuous improvement.

In the following we will explain and discuss in detail the requirements of an efficient EMS according to the basic *Deming Cycle* (see Figure 1.3).

1.4.2. Total Quality Management

Most organisations apply *Total Quality Management* (TQM) principles to some of their operations and activities. An effective EMS is built on TQM concepts. TQM was mostly devel-

oped in the US, though the Japanese were the first to visualize its benefits and apply it successfully. They found that if management and employees solved problems together, everyone was committed to the solution. TQM differs from traditional quality improvement techniques in several ways. Most important is that it focuses on system problems. Statistical methods are used to find the reasons for problems, and active employee involvement is required. TQM uses new and alternative methods to improve an organisation's performance while involving all hierarchical levels of staff – from top-management to front-line workers.

Some of the many benefits of a TQM system are:

- Reduction of operating costs.
- Increase in customer satisfaction.
- Improvement of organisation morale.
- Establishment of a process of continuous improvement and business process reengineering.
- Gaining competitive advantage.
- Establishment of a base for ISO registration.

There are three core principles of quality management:

- Quality means that customer specifications are satisfied by a product or a service. Quality cannot be seen as something that is better or more expensive, it only relates to customer satisfaction.

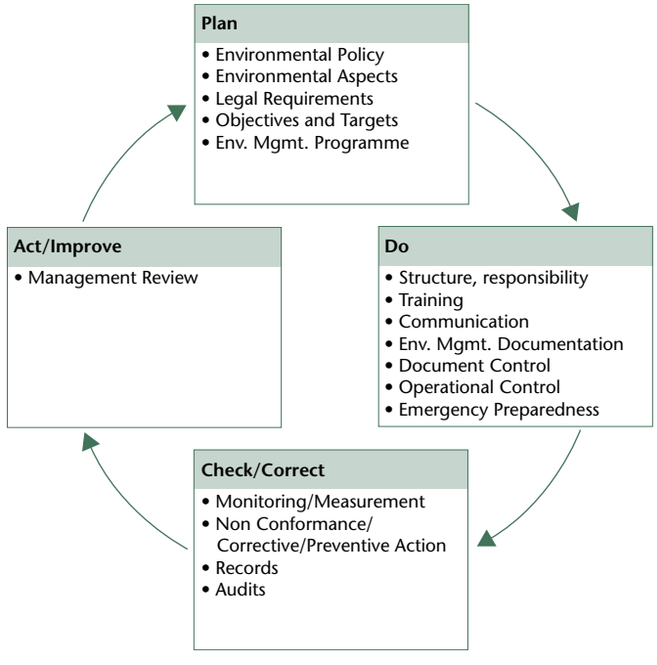

Figure 1.3 *Elements of ISO 14001 at Each Step of the Deming Quality Management Model [UNEP/ICC/FIDIC, 1996, p. 7].*

Figure 1.4 *Many industrial sites in the region are in need of better management.*

- Everything that is being produced in an organisation, whether it be a product or a service, must be defect free. Being close to that is not enough, and every employee of the organisation must be aware that their own attitude influences quality. This makes TQM both an "organisational philosophy as well as a question of individual commitment."
- Quality is measured by the price of non-quality (PONQ). PONQ is what it costs an organisation in time, money and other factors that are harder to quantify, when the organisation is not performing properly (See Internet Resources: Customer Focused Quality).

TQM is not only quality management. It involves many more issues such as work safety, risk management, financial management and of course environmental management, depending on the individual situation of every organisation.

TQM influences all employees of an organisation. It enables an organisation to be more flexible and increases the motivation of the employees. As well, it makes it easier to develop long term relations between both an organisation's customers and employees.

1.5. Risk Management and EMS

"A life without adventure is likely to be unsatisfying, but a life in which adventure is allowed to take whatever form it will is likely to be short." [Bertrand Russel]

This section deals with risk management, though it is not a key element of environmental management. It is, however, an important issue that should be addressed by every EMS. The reason is that uncontrolled risks can cause tragedy and fi-

nancial ruin. Risk management experts Hargreaves and Mikes [2001] give the following definition of risk:

"Risks are uncertain future events that could expose the organisation to the chance of loss. Loss is a relative concept: a reference level needs to be defined to measure it. A frequently used reference level […] is the list of objectives set out in the business plan. Therefore risks may be regarded as uncertain future events that could influence the achievement of the [organisation's] strategic, operational and financial objectives."

In recent years insurance companies and banks have shown a growing interest in environmental risks (for business reasons only). The question was whether an organisation that has a well functioning EMS has real control over its environmental risks and potential liabilities. The result was that many organisations in high risk sectors were able to lower their insurance rates or increase their credit rating with banks and insurance companies [World Bank, 1998, p. 164].

The main objective of risk management is to reduce risks for both an organisation and its owner. Risk management tries to erase an ever existing uncertainty. This uncertainty can have different sources as shown in Figure 1.5.

Appropriate risk management is meant to ensure compliance with relevant legal requirements and to assess existing risks in order to optimise resource utilization. It should also enable risk prevention in the planning, controlling and monitoring stages of business activities. Business responsibility is impossible to separate from risk responsibility.

Inappropriate risk management involves great liabilities, as is shown in Figure 1.6. Appropriate risk management requires good technical risk assessment. Based on this, impacts on humans and the environment can be minimised while maximising sustainability. Inadequate risk assessment on the other hand can lead to environmental damage, risk to humans and unsustainable activities.

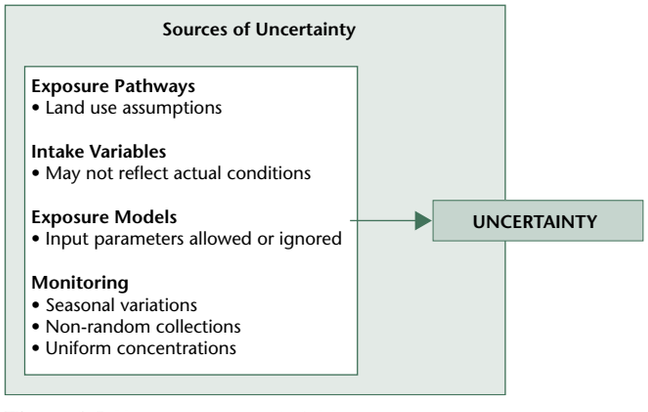

Figure 1.5 *Uncertainties in Risk Management [UNEP, December 1999].*

Different kinds of risks need to be distinguished in order for management to be most effective:

- **Organisational risks** (i.e. follow-up regulation, legally consistent assignment of tasks).
- **Financial risks** (i.e. organisation financing, loan/interest / currency risks, bad debt loss).
- **Operative risks** (i.e. insurance of production, process control, quality management, safety know-how, IT-risks).
- **Market risks** (i.e. dependency on single customers and suppliers, risk of sudden changes in market situation, image risks).
- **Legal risks** (i.e. liability resulting from non-compliance with legal requirements, risks resulting from product liability, patent risks).
- **Environmental risks** (residual waste, gaps in insurance coverage, emergency preparedness).

A risk management system can consist of six modules:

1 **Risk analysis:** Identification of the organisation's risks.
2 **Risk assessment:** Assessment according to quantifiable and reproducible criteria (risk categories).
3 **Enhanced analysis in problematic sectors:** Examination of sectors identified as being problematic by specialists.

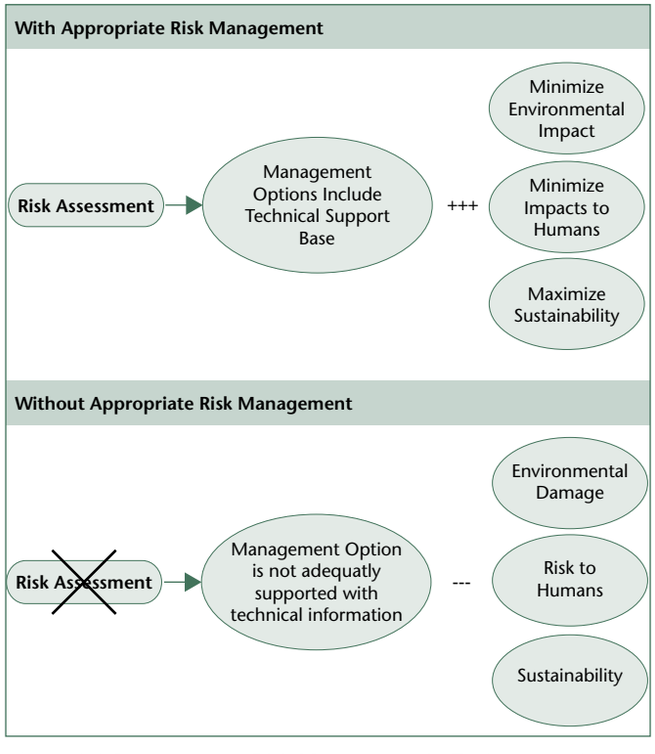

Figure 1.6 *Importance of Risk Management in Environmental Management [UNEP, December 1999].*

4 **Action plan:** Establishment of adequate instant measures (prevention before minimization before shifting before self support).
5 **Realization of measures:** Realizing planned measures.
6 **Risk controlling:** Introduction of an early warning system with regular audits and reviews (establishment of early warning indicators).

A good way of managing risks is to classify them. This classification should cover all activities of an organisation. The risks can then be expressed in terms like high, medium, or low, but a more detailed classification may be chosen as well. It should be remembered that all employees need to be involved in risk management. Employees have to deal with most of the risks, so their awareness should be raised as much as possible. In connection with the classification into high, medium and low, it may also be useful to develop a probability scale, that forecasts how often an incident may take place.

A working EMS is an efficient instrument which can help manage and control risks due to an organisation's activities.

More information about risk management is available in the "Technical Workbook on Environmental Management Tools for Decision Analysis". (See Internet Resources: Technical Workbook on Environmental Management Tools for Decision Analysis.)

Study Questions

1. Think of a company or organisation that you are familiar with. Why would this company possibly need an EMS? And what could be some of the benefits?
2. Why is it so expensive to establish an EMS? How can costs be kept down without reducing the EMS's effectiveness?
3. Why are EMSs an especially important issue in the Eastern European countries? What are the problems?
   Can you think of a company or organisation you are familiar with that already has established an EMS? What were the benefits?
4. The Deming Cycle forms the base of most EMSs.
   How does it work and what do you think are advantages with this approach? Are there any disadvantages?
5. How can uncertainties increase an organisation's vulnerability? Can risk management help overcome these uncertainties? Can environmental management have any positive impact on risk management, and if yes, how?

Internet Resources

EMAS – Accession countries

http://europa.eu.int/comm/environment/emas/activities/accession_en.htm

Customer focused quality

http://www.customerfocusedquality.com

Technical Workbook on Environmental Management Tools for Decision Analysis

http://www.unep.or.jp/ietc/publications/techpublications/techpub-14/index.asp

EMAS – Member State activities

http://europa.eu.int/comm/environment/emas/activities/index_en.htm

The Deming Cycle

http://www.balancedscorecard.org/bkgd/pdca.html

Nonprofit Risk Management Center

http://www.nonprofitrisk.org/

European Institute for Risk Management

http://www.eirm.net/

The costs of EMAS

http://europa.eu.int/comm/environment/emas/tools/faq_en.htm#costs

The benefits of EMAS

http://europa.eu.int/comm/environment/emas/tools/faq_en.htm#benefits