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February, 2019

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ISBN: 987-93-88498-

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Further information on the IGNOU courses may be obtained from the University's office at Maidan Garhi, New Delhi or the official website of IGNOU at www.ignou.ac.in

Printed and published on behalf of IGNOU, New Delhi by Registrar, MPDD, IGNOU, New Delhi.

Laser Typeset by Rajshree Computers, V-166A, Bhagwati Vihar, (Near Sec. 2, Dwarka), New Delhi

Printed at:

BLOCK 4 INTRODUCTION

Block 4 deals with environmental standards. This block comprises of 4 units- environmental design, Environmental Management System, EMS standards ISO 14000, and environmental labeling.

Unit 1 deals with Environmental design which is not a new phenomena it has been part of our ancient architecture. A key aspect of eco-friendly and economic sustainability ease and environmental design which consists of a systematic consideration of environmental performance and potential environmental impacts at the earliest stages of product design and development. It covers all the stages of a project or product lifetime that includes procuring raw material, manufacturing, packaging, distribution, installation, operation and finally the useful product lifetime.

Unit 2 deals with Environmental Management System. All organizations like companies, industries, institutions have impact on environment. Environmental Management System is a tool to manage quality and safety, it assesses an organization's business strengths and weaknesses that help to make out and manage significant environmental impacts by saving money and resources. It explains core elements of Environmental Management System (EMS), its policy and implementation and operation techniques. The certification body of EMS was discussed about ISO 14001, EMAS, BS8555 standards. It highlighted the assessment of EMS by explaining characteristics of the operations like tract performance and conformance with environmental goals, calibration techniques, calibration devices and compliance with applicable regulations.

Unit 3 deals with EMS standards ISO 14000. It explained the occupational health and safety assessment series 18001 compatible with ISO 9001 quality and ISO 14001 environment management standards. This unit broadly covers ISO, ISO 14000 and EMS. It explained Plan- Do-Check-Act (PDCA) cycle. It provided the information about ISO family standards, benefits of implementing ISO 14001 and finally integrated management system.

Unit 4 deals with Environmental labeling. This unit highlighted the different issues related to issuing of eco-labels to a product, their objectives, origin and classification. The environmental labels (Eco-labels) are based on the environmental performance of a product on the environment. There are three major components of environmental labeling which provides unbiased involvement of third party is necessary during certification, that should be voluntary/ financial firms and finally the labeling can be positive or negative. ISO is an autonomous body which works to achieve different goals for effective implementation of eco-labeling. The concept of eco-labeling is based on environmental concert of a product it is awarded by an independent body to a manufacturer or service provider on the basis of their environmental impacts by using lifecycle assessment tool. The objectives are based on efficient use of non-renewable resources; management of resources; handling and management of chemicals, adopting the principle of reduce, reuse and recycle strategy and finally promoting natural resource conservation. This unit also elaborated environmental labels developed by ISO. This unit concluded by explaining the concepts of green claims, eco-mark and the mechanism of SCHEME.



UNIT 1 ENVIRONMENTAL DESIGN

Structure

- 1.0 Introduction
- 1.1 Objectives
- 1.2 Definition and Scope
- 1.3 Principles and Benefits
 - 1.3.1 Principles of Environmental Design
 - 1.3.2 Benefits of Environmental Design
- 1.4 Environmental design for Buildings
- 1.5 Concept of Green Buildings
 - 1.5.1 Objectives of Green Buildings
 - 1.5.2 Elements of Green Buildings
 - 1.5.3 Example of Green Buildings in India
 - 1.5.4 Rating system for Green Buildings
- 1.6 Green Infrastructure
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- 1.8 Green Landscaping
 - 1.8.1 Principles of Green Landscaping
- 1.9 Let Us Sum Up
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- 1.12 Answers to Check Your Progress

1.0 INTRODUCTION

Environmental design is not a new word; it has been part of our ancient architecture. If we deeply observe, engineering challenges were answered with delicate design intelligence in our ancient structures. Environmental design means an integrated approach to technologically feasible and economically viable way of design. An environmental design is a way to create human spaces, which are beneficial for both community and natural environment and achieve a sustainable and eco-friendly result.

A key aspect of eco-friendly and economic sustainability is an environmental design consists of a systematic consideration of environmental performance and potential environmental impacts at the earliest stages of product design and development. Environmental design considers various effects on the environment at all the stages of a project or product lifetime, including raw materials acquisition, manufacturing, packaging, distribution, installation, operation, and ultimate fate at the end of the useful product lifetime. Environmental design concentrates on the entire cycle of manufacturing products and providing services. Hence, environmental design is much more

effective and economic than more primitive pollution measures. Environmental design is composed of two broad fields; the first field of environmental design is ‘**design for sustainability**’, which focuses on conservation of resources through minimizing the uses of energy, mineral, material and water, and also aims to preserve natural capital. The second area is ‘**design for health and safety**’ of occupants. Here the main focus is to reduce risks from toxic and harmful substances, pollutants, and waste as well as concerns related to public health and safety.

In environmental designing, both commercial and residential structures are built using environmentally friendly material. Environmental design involves professionals (environmental designers) in the fields of urban planning, landscape architecture, who assist and guide in the development of right infrastructure. These professionals focus on the use of environmentally sensitive techniques and materials. Their main focus is to study the relationship between man-made structures and the surrounding environment to develop optimum infrastructure, including commercial and residential buildings by taking into account functional, economic and ecological needs.

1.1 OBJECTIVES

After finishing this unit, the student will be able to:

- define environmental design;
- explain the basic principles and benefits of environmental design;
- discuss the objectives and potential of environmental design (ED); and
- explain the concept of green building, green infrastructure and green landscaping in deep.

1.2 DEFINITION AND SCOPE

Environmental design is a process which concentrates on creating structurally sound buildings for commercial and residential purposes that are not only functional but environmentally responsible as well. Main fields in environmental design are urban planning, architecture, geography, landscape architecture and interior design.

Earlier, environmental design comprised of an interdisciplinary area focused on historical conservation and lighting design. Presently, the term has expanded and extended to apply to larger scope involving ecological and sustainability issues. Environmental design does not mean a single or particular approach. It involves interdisciplinary areas such as architecture, urban planning and landscape design, and emphasis on the relationship of built infrastructure, urban landscapes and natural surroundings. Environmental designers construct buildings, landscapes and open civic spaces to be functional, be aesthetically pleasurable to users and to promote community development without harming natural environment.

The scope of each project that emphasizes environmental design includes the following parameters:

- Collection, processing and management of solid wastes,

- Environmental impact assessment (EIA) and its alleviation,
- Water supply,
- Air pollution, biodiversity and soil conservation, and
- Treatment of wastewater

1.3 PRINCIPLES AND BENEFITS

Dear learners, let us now read about principles and benefits in the following sentences:

1.3.1 Principles of Environmental Design

Principle-1 Energy conservation

The prime aim of environmental design is reduction in operational energy consumption from the built infrastructure and focuses on the reduction in carbon emission and cost savings. This can be achieved by following the energy hierarchy, which is one of the most effective ways to reduce the energy related environmental impacts of buildings. The designer should follow and include the energy hierarchy in the building design (Fig. 1). Energy conservation should be kept in mind while designing new building and renovating old buildings.

Step 1- Reduction in energy demand

Here the main aim of the designers is to reduce the demand of energy in the new buildings. In any building, energy is needed for lighting, heating, cooling and cooking. Energy requirement can be reduced by selecting energy efficient devices, insulation of building, the use of insulated pipes and ducts, natural ventilation, use of daylight and passive design.

a. Step 2- Energy efficiency

During the designing of energy efficient building various energy efficiency services, appliances/equipment and controls should be used in the building. This can be achieved by adopting following approaches such as the use of high efficiency lighting system (LED lamps) and goods.

b. Step 3- Use of renewable and low/zero carbon emission technologies

The energy requirement in buildings should be fulfilled from on-site renewable sources. Low or zero carbon emission technologies should be incorporated to provide as much energy as is technically and economically feasible sources. This includes considering rooftop solar water heaters, solar PV panels, wind energy, biomass energy etc.

c. Step 4 – Purchase green energy

The building will fulfill its remaining energy needs by purchasing Green Energy Tariff (electricity generated from renewable energy sources off-site). These steps would be beneficial for the growth and development of new large-scale renewable energy generation and infrastructure. A green energy tariff works by the supplier promising to match all or some of the electricity with renewable energy, which it then feeds back into the National Grid. As more people sign up to a green energy tariff, the bigger the percentage of green energy in the national supply.

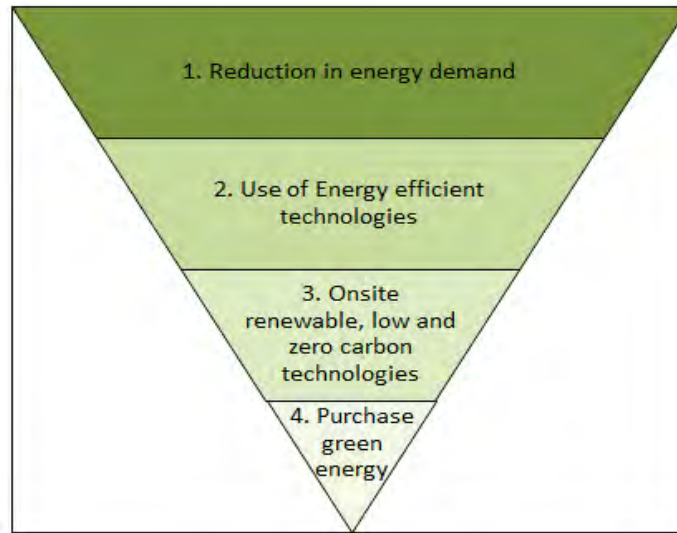


Fig. 1.1: Energy hierarchy of environmental design.

Principle 2- Building Materials

In the construction of a building with environment design, various materials are required in different quantity. Usually, products made from natural, renewable materials and products with recycled content are used. Use of eco-friendly building materials in construction reduce environmental impacts and life cycle impacts and are economic on a long term basis. Earlier stages of the material life cycle, such as extraction, processing, manufacturing and transportation to site should also be considered, because these stages may cause significant impacts on the environment. Other environmental impacts of materials such as over-utilization of resources, forest cutting, rise in climate change, environment pollution etc., should also be kept in mind. So it is necessary to take steps to reduce the life cycle impacts of building materials in any construction.

Principle 3-Water Consumption and Drainage

Reduction in water intake should be practiced through various water conservation measures in buildings. Water conservation should be cost effective and use of alternate water sources also be practiced in the building. Utilization of sustainable drainage measures must be used to reduce surface water run-off and flood risk. This can be achieved by various methods, i.e. by installing water efficient technologies to promote the use of rainwater and recycled water. Sustainable urban drainage systems such as green roofs, rainwater harvesting and permeable paving should be adopted in building to reduce water runoff.

Principle 4-Biodiversity

The designer should focus on enhancing biodiversity and encouraging its profits for occupants and local communities. They are responsible for the protection of biodiversity and to recognize chances for enhancement. This can be attained by confirming that all natural habitats are protected during construction of structures. During the construction work opportunities should be recognized on the project site to recover biodiversity. This can be attained by including green roofs, green walls, boxes for birds, planting trees or the inclusion of water bodies. Further, other opportunities can be recognized to include emergent spaces as part of new projects.

Principle 5-Minimize Travel Impacts

The designers should keep an eye on the impact associated with the travel arrangements for workforces, occupants and locals. Planning should be done to reduce the impacts of travel by encouraging the use of efficient modes of transport that decrease environmental impact, reduce congestion and air pollution.

Principle 6-Waste Management

The designer should focus on employing the waste hierarchy (refuse, reduce, reuse, recycle and dispose). Various methods should be used in design to reduce the quantity of waste generated during different stages of construction.

Principle 7- Pollution Control

Provisions for the prevention of pollution should be proposed and applied to the project. This can be achieved by reducing local discharges to air, land and water. It can be done by modifying building materials, proper drainage system, use of non-toxic materials, and use of green energy at site for different activities and by reducing transportation. This is particularly important during construction and refurbishment activities on a project. All designers must obey with the overall practice for health, safety and the environment.

1.3.2 Benefits of Environmental Design

Environment design is the need of the day considering the negative impact caused on the natural environment in the post industrialization period of human history. The benefits of environmental design are the following:

- Environmental design provides more business, by promising a healthy environment with sustainable design.
- Use of environmental design can create a unique and beautiful appearance too.
- The basic concepts of environmental design can enable reduction of environmental impact of a product during the process by optimizing the usage of raw materials and energy, management of wastes, and prevention of pollution in the future.
- It is an economically viable design, which meets the consumers need by reaching their expectations in terms of reasonable price, steady performance and quality of the product.

Check Your Progress 1

Note: a) Write your answer in about 50 words.
 b) Check your progress with possible answers given at the end of the unit.

1) What do you understand by Environmental design?

.....

2) What is a Green Energy Tariff?

.....
.....
.....

3) What are the benefits of Environmental design?

.....
.....
.....

1.4 ENVIRONMENTAL DESIGN FOR BUILDINGS

Environmental design of buildings involves adopting techniques that ensure that the structure is designed, built, renovated, operated or reused in a sustainable and resource efficient manner. Environmental building design is also called green building design or eco construction or green construction. Initially the construction and design of green building may cost much more than a conventional building. Nevertheless, due to the least operating cost of environmentally designed building the overall cost comes down in the future. The green building practice applies a project life-cycle cost analysis for calculating the suitable upfront budget. This analytical method calculates costs over the useful life of the asset. It is necessary to take the help of professionals during the design and construction phase of building to reduce the expenditure.

1.5 CONCEPT OF GREEN BUILDINGS

Worldwide, the construction industry consumes a huge amount of renewable and nonrenewable resources (energy, water and raw materials) and generates a large amount of wastes (solid as well as liquid) and greenhouse gases. This has resulted in an increase in overall awareness about the importance of sustainability in the construction industry. Consequently, the demand for sustainable and green building concept is gaining importance in various countries past years. To date much of the emphasis in green building development has been on optimizing energy and resource efficiency. A green building, usually refers to a building that utilizes less water and energy, generates fewer wastes, effectively uses natural resources and provides healthier space for inhabitants than a conventional building (Fig. 2). They must also support the comfort and well-being of their occupants.

1.5.1 Objectives of Green Buildings

Green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment in several ways. The main objectives of green buildings are as follows:

- To minimize the use of resources, maximize the reuse of materials, promotion of recycling and utilization of renewable resources in buildings,
- To reduce impact on the environment,

- To enhance the use of efficient building material and construction practices,
- Provide a comfortable, healthy and hygienic indoor environment for occupants, and
- To encourage the reduction of waste generation and efficient waste management practice, thereby decreasing pollution, and minimizing environmental degradation.

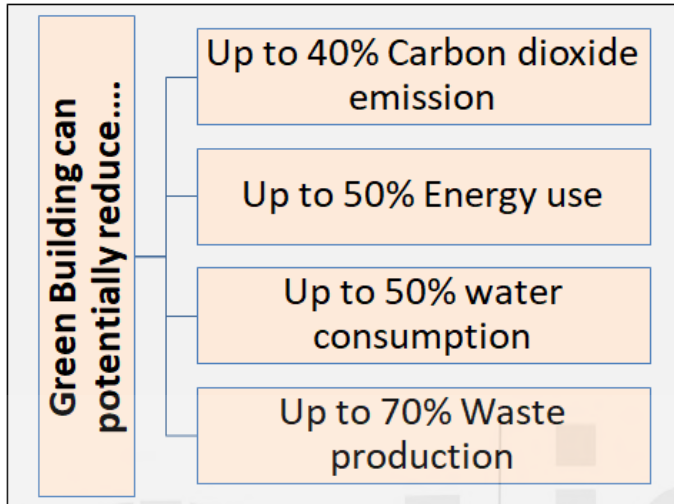


Fig. 1.2: Potential of green buildings in reduction of resource use and waste

1.5.2 Elements of Green Buildings

There are five most important elements of green building (Fig. 3). These elements should be considered while designing any new green building.

- **Smart Design (structure efficiency)**
Design has the biggest impact on cost and performance of a building. Its main intentions are to minimize the total environmental impact associated with all life- cycles of buildings.
- **Energy Efficiency**
For energy efficiency, the main strategy is to reduce the operating energy use in the building. Use of renewable energy such as solar power, wind power, hydro power and biomass can significantly reduce the environmental impact of a building. Use of energy efficient tools and technology is also a solution.
- **Eco Materials**
For a suitable green building the building construction materials should be natural, renewable, recycled or recyclable and eco-friendly. Examples are timber from forest, renewable plant materials like bamboo and straw and other products that are non-toxic, reusable, recycled, etc.
- **Water Conservation**
Decreasing water consumption and shielding water quality are the key objectives of green building. The use of non-sewage and greywater for

on- site use such as site-irrigation and watering plants will minimize demands on the local aquifer.

- Waste and Toxic Reduction

The quantity of waste can be reduced by recycling and reusing the resources.

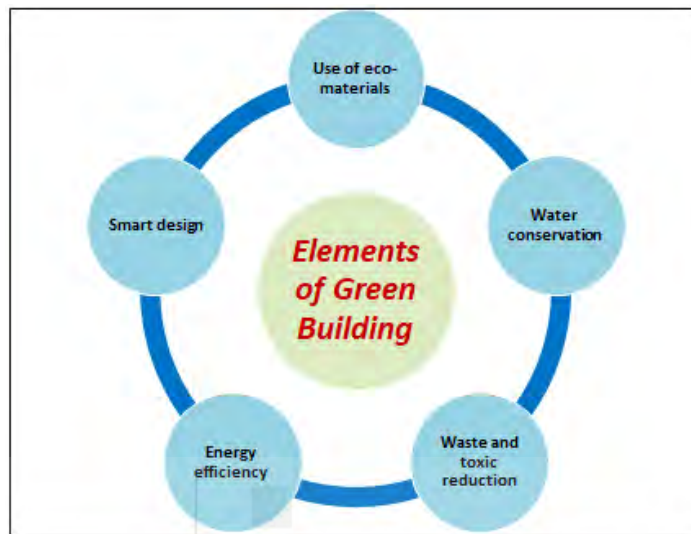


Fig. 1.3: Elements of green building

1.5.3 Examples of Green Buildings in India

Example 1: Suzlon One Earth, Pune

Suzlon One Earth’s office building is designed in a unique manner by Pune based architect, Christopher Charles. The building is one of the biggest green building projects (about 10 acres in area) in India. This is the first building in the country, which has received LEED (Leadership in Energy and Environmental Design) certificate and has also received ‘Platinum’ rating in 2010. All the energy requirement of the building is fulfilled by on-site and off-site renewable sources. About 7% of total energy requirement of the building is generated by on-site 18 hybrid wind turbines and the remaining energy need is derived from off-site renewable energy sources. Further, the building is designed in a manner to utilize maximum sunlight and to reduce the use of energy consumption for lighting. Green practices such as rainwater harvesting systems, green areas, establishment of water permeable spaces, are used in the campus infrastructure to reduce storm water runoff and ground water recharge.

Example 2: Shapath V, Ahmedabad

Shapath V is 20000sq yards of land area developed by Savvy Infrastructures Ltd., Ahmedabad. It is the first LEED certified and ‘gold’ rated green building in Gujarat assessed by the Indian Green Building Council (IGBC). The developer has used energy conservation technologies such as high roof height, double glazed windows and central air conditioning with chilled water supply. For water conservation, the building adopted several steps such as rainwater harvesting system, water recycling, on-site

wastewater treatment plant etc. The building is also designed to reduce the carbon dioxide level produced in the building. The other major features of the building are multi-level parking, waste management, and use of eco-friendly, recyclable, recycled and renewable materials.

1.5.4 Rating System for Green Buildings

A building is really green or not, is defined on the basis of predefined rating systems set by various agencies. The rating system is mostly voluntary systems that have evolved over the past more than 20 years. These rating systems are developed on the basis of green materials and technologies used presently. Worldwide, large numbers of rating tools have evolved in a numerous nations that are likely to stimulate market and consumer interest in green buildings. A wide range of rating systems, have evolved in different parts of the world based on local climates and geographical conditions (Table 1). The key objective of these rating systems is to facilitate a general approach to make eco-friendly buildings, through architectural design, effective handling of waste, water and energy efficiency, and focus on occupant comfort and health.

Table 1.1: Widely used Green Building rating agencies and systems in world

S.no.	Rating agency/system	Country
1.	India Green Building Council	India
2.	Green Rating for Integrated Habitat Assessment (GRIHA)	
3.	Leadership in Energy & Environmental Design-India (LEED-India)	
4.	World Green Building Council (WGBC)	USA
5.	The Green Globe Rating System	
6.	Energy Star	
7.	Leadership in Energy & Environmental Design (LEED-USA)	
8.	Green Globes	USA and Canada
9.	Green Star	Australia
10.	Australia Greenhouse Building Rating (AGBR)	
11.	Building Research Environment Assessment Method Consultancy (BREEAM)	United Kingdom
12.	Ecology, Energy Saving, Waste Reduction and Health (EEWH) (Taiwan)	Taiwan
13.	Building Environment Assessment Method-Hong Kong (HK-BEAM)	Hong Kong
14.	Comprehensive Assessment System for Building Environment Efficiency (CASBEE)	Japan

15.	Thai's Rating of Energy and Environmental Sustainability (TREES)	Thailand
16.	Green Mark	Singapore
17.	Green Building Council (Korea)	South Korea
18.	European Environment Agency Rating	Europe
19.	Philippine Green Building Council	Philippine
20.	Leadership in Energy & Environmental Design-Canada (LEED-Canada)	Canada
21.	Leadership in Energy & Environmental Design-Brazil (LEED- Brazil)	Brazil
22.	German Sustainable Building Certificate (GSBC)	Germany

1.6 GREEN INFRASTRUCTURE

There are several definitions of green infrastructure are available in books, articles, research papers and websites. Different authors and practitioners focus on different scope/components as per their interest. The broad scope definition is presented by the Countryside Agency (2006) "Green infrastructure comprises the provision of planned networks of linked multifunctional green spaces that contribute to protecting natural habitats and biodiversity, enable response to climate change and other biosphere changes, enable more sustainable and healthy lifestyles, enhance urban live ability and wellbeing, improve the accessibility of key recreational and green assets, support the urban and rural economy and assist in the better long-term planning and management of green spaces and corridors". In simple words, green infrastructure is an effective, economic, smart and multi-purpose approach solution of present needs, which enhances the safety and quality of public life. The key constituents of this approach include management of storm water, climate adaptation, reduced heat-stress, biodiversity conservation, enhancement in ecosystem health, sustainable energy production, clean water supply and improve soil quality. Besides these, it also involves other human centric functions such as increased quality of life through recreation and providing shade and shelter in and around rural and urban areas. Green infrastructure also helps to deliver an ecological framework for social, economic and environmental health of the surrounding. Green infrastructure mainly focused on nature-based solutions to improve infrastructure, by maintaining healthy ecosystems through the connectivity of fragmented natural areas and restore damaged habitats. It is a multi-approach concept, which may be used on different levels, from a small scale on individual house or building level and to a broader landscape level. Rainwater harvesting systems, green roofs, establishment of rain gardens, infiltration planters, permeable roadways/footpaths, trees and tree boxes are the some examples of local level green infrastructure practices. On a large scale, the preservation and restoration of natural landscapes (such as forests, floodplains and wetlands) are critical components of green infrastructure.

One of the major principles of green infrastructure is the formation of connective networks that allow migration and movement (ecological, economic or social) by connecting a number of supporting systems. Biodiversity is also a core

element; therefore the levels of biodiversity should be maintained and safeguarded in the development of green infrastructure. The main benefits of green infrastructure are given in table 2.

Table 1.2: Different benefits achieved by adopting Green Infrastructure

Benefits	Types
Environmental/ Ecological benefits	<ul style="list-style-type: none"> ● Provision of clean water supply ● Reduction in air and water pollutants ● Rainwater retention and ground water recharge ● Control of soil erosion ● Improvement in soil/land quality ● Increased in pest control ● Enhancement in pollination ● Improved habitats for wild flora and fauna ● Habitat connectivity ● Landscape permeability ● Improve watershed health
Social benefits	<ul style="list-style-type: none"> ● Provide a good and healthy environment to live and work ● Creation of green jobs ● Increase in recreation spaces which enhance tourism ● More attractive and greener cities
Economic	<ul style="list-style-type: none"> ● Diversification of local economy ● Reduce hard infrastructure construction costs ● Reduce energy consumption and costs ● Maintain aging infrastructure ● Increase in property values ● Increase life cycle cost savings
Other benefits	<ul style="list-style-type: none"> ● Climate resiliency ● Efficient land use ● Carbon storage and sequestration ● Alleviation in urban heat island effects ● Prevention of disasters such as forest fires, floods etc.

1.7 GREEN CONSTRUCTION MATERIALS

Construction of buildings and structures are responsible for impacts on the environment in different ways, such as consuming natural resources, energy, affecting biodiversity and environment pollution. The green building includes numerous approaches during design, construction and operation of a building project. If we are going to construct a green building, it can be achieved by using “green building materials”. The green construction materials are environmentally responsible materials as compared to usual construction materials and have a lesser environmental impact.

Preferably these green materials should not have any negative impact on the environment and should be infinitely reusable or recyclable. However, in real situations it is hard to find such material. But materials, which can eliminate or reduce the negative impact, can be considered as green building materials. Few examples of green construction materials are bamboo, recycled plastic, fly ash mixed cement and bricks, wood, wood bricks, recycled polyester, low VOC Paint and finishes, recycled glass, soybean fabric, organic cotton, recycled steel, stones, clay, etc. Green building materials should have at least one or more following environment and /or health traits.

- It should encourage indoor air quality of the building.
- It should be free from harmful substances such as toxic metals, Chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), ozone depleting substances (ODSs), Volatile organic compounds (VOCs) and other pollutants.
- It should incorporate recycled content (post-consumer and/or post-industrial).
- It should be recyclable or have been recycled from existing or demolished buildings.
- Renewable resources should be used in formation of material.
- Material should be strong and need lesser care.
- It should be obtained from local resources and manufacturers.
- It should have low embodied energy.
- It should be biodegradable in nature.

Green construction can significantly reduce the environmental impacts of a new building by observing the complete life cycle of building materials. So it is necessary to consider the life cycle of building materials before construction. The life-cycle of a building material can be considered to have five stages:

- mining/extraction
- manufacture
- construction
- use
- demolition

In most of the cases, the major environmental impacts occur due to the first two stages (mining/extraction and manufacturing). The most factors to determine the impact on the environment includes loss of biodiversity, pollution of air, water and land. The consumption of energy for the production of construction material is also an important indicator of its impact on the environment. However, waste generation is a key concern of the last stage of the material cycle due to its proper disposal related issues.

Five main elements for assessing and choosing green construction materials are based on these factors:

1. Environmental factors
2. Local materials and transport requirement
3. Needs of occupants of houses
4. Need for suitable building design for marketing
5. Need for financial viability/affordability

1.8 GREEN LANDSCAPING

Landscaping is a method of physical modification of the landscape to serve the needs of the public. Conventionally, the main focus of landscaping was on making maximum human functionality and aesthetics of open areas by using plants, modifying the shapes of the land and building facilities such as pedestrian walkways, paths and picnic/resting areas. But recently a new method of landscaping has emerged commonly called Green landscaping. This new method design, creates, and maintains landscape in such a way, that it saves time, money, and energy. It is functional, aesthetically pleasing, low maintenance, cost effective, and environmentally sound landscape. So, green landscaping is a method to plan, create and maintain an aesthetically pleasing and environmently friendly landscape, without using harmful materials, unsustainable techniques and toxic chemicals. Green landscaping is efficiently a way of designing and conserving outdoor gardens and public spaces in such a way as to:

- Minimize destruction to the natural environment;
- Maximize the ecological function of the landscape (to supply ecosystem goods and services);
- Save time and money with lower maintenance requirements;
- Create a healthier and safer places for people to live, work and play.

1.8.1 Principles of Green Landscaping

Green landscaping can be achieved by using a variety of methods, these basic elements that are extremely useful. Each of these elements will help in maintaining green landscaping.

1. *Design with Nature for People*
 - a. Maintain a balance between environmental, human and economic necessities.

- b. Design to blend the landscape into the local natural surroundings.
- c. Use design which requires minimum maintenance
- d. Avoid altering existing natural habitats and ecosystems

2. Plant Selection

- a. Plants are the key part to the “green” portion of green landscaping.
- b. Use local plant species, because local or native plants are naturally adapted to the local climate.
- c. To avoid monoculture, use a variety of plant species.
- d. Avoid using exotic invasive species

3. Water Responsibly

- a. Use of permeable pavers increases infiltration and reduce rainwater run-off.
- b. Water grass occasionally in summers as it is naturally programmed to go into dormancy.
- c. Use of xeriscaping (drought-tolerant landscaping) is also helpful in water conservation.
- d. Use organic materials in garden beds and around trees to conserve soil moisture.
- e. Include rainwater harvesting systems in the design and use that water for plant needs.
- f. Also include grey water recycling systems where appropriate.
- g. Change in watering methods or process to save water (timing of water, amount of water, water to a particular part of the plant, use of sprinklers, drip irrigation etc.)
- h. Left some shallow depression, where runoff is directed.

4. Reduce Chemicals and Pollutants

- a. Reducing the use of chemicals in green landscaping will be beneficial for the environment and wildlife.
- b. Instead of chemicals, add manure or compost to improve the quality of soils.
- c. Use organic waste of lawn for composting and to reduce disposal cost
- d. Do not use polluted water to irrigate your landscape; it will add pollutants to your garden.
- e. Trim your lawn less frequently to preserve soil moisture and maintain healthy root structure.
- f. Promote the use of manual tools as compare to power driven equipment's.

5. Green Energy/products

- a. Use renewable energy for street / landscape lighting (Solar PV cells, wind energy).
- b. Use energy efficient or low energy consuming devices (LED for street lights).
- c. Use eco-labeled or green certified products
- d. Use recycled and recyclable materials

Check Your Progress 2

Note: a) Write your answer in about 50 words.
 b) Check your progress with possible answers given at the end of the unit.

- 1) Write a note on two more green buildings and describe their features.

- 2) What is “green infrastructure,” how it is beneficial for the environment?

- 3) Enlist various properties that are needed in a green construction material.

1.9 LET US SUM UP

Now we are aware with the term ‘Environment Design’, its scope, principles and benefits. Environmental design is a plan to utilize land and natural resources in a sustainable way for the growth and development of rural, urban and suburban communities. The main principles of environmental design are energy, water and resource conservation, use of sustainable materials, waste management and pollution control. This unit also focuses on the concept of green buildings, objectives of green building and various elements that should be considered during designing of a green building. Examples of green buildings are also discussed with their green features to illustrate the concepts. A rating system for green buildings is also mentioned in brief with a detail of globally present rating systems. Green infrastructure is an economic, smart and multi-purpose healthy approach for managing urban and climatic challenges by building with nature. Its main constituents include storm water management, climate adaptation, biodiversity conservation, enhancement in ecosystem health, sustainable energy production, clean-water supply and improve soil

quality. The concept of green building can be achieved by using green building materials, these construction materials are environmentally responsible materials as compared to general construction materials. The chapter also provides guidelines and principles for the designing and maintaining green landscaping.

1.10 KEY WORDS

Biodiversity	: The relative abundance and variety of plant and animal species within a given ecosystem, biome or for the entire Earth.
Environment	: It can simply define as one's surroundings (biotic and abiotic environment) that include everything around the organism.
Ecology	: Ecology is a branch of science which deals with the interrelationships between the biotic (living) and abiotic (nonliving) components of an ecosystem as well as the relationship of the individuals of biotic components.
Habitat	: It is concerned with a physical space occupied by an organism.
Runoff	: That part of rainfall or irrigation water that runs off the land into streams or other surface water.
Urban Heat Island Effect	: Sometimes cities or towns are typically warmer compared to their adjacent rural areas due to human activities. This temperature difference is due to the uncommon state known as the urban heat island.

1.11 REFERENCES AND SUGGESTED FURTHER READINGS

1. Green Building Fundamentals. Mike Montoya, 2011.
2. Green building materials. Ross Spiegel, 1999.
3. Countryside Agency. Countryside In and Around Towns: The Green Infrastructure of Yorkshire and the Humber. Countryside Agency, Leeds 2006.
4. <https://www.mmu.ac.uk/environment/ems/environmental-design-principles-for-tenders.pdf>
5. <https://www.epa.gov/green-infrastructure/benefits-green-infrastructure>
6. Sustainable Construction: Green Building Design and Delivery. Charles J. Kibert, 2005
7. [http://www.grihaindia.org/Green Building A to Z: Understanding the Language of Green Building. Jerry Yudelson, 2007](http://www.grihaindia.org/Green%20Building%20A%20to%20Z%20Understanding%20the%20Language%20of%20Green%20Building.pdf)

1.12 ANSWERS TO CHECK YOUR PROGRESS

Answers to Check Your Progress 1

Your Answer should include the following points:

- 1) To find answer read section 1.2 of this unit

Answers to Check Your Progress 2

Your Answers should include the following points:

- 1) CII-Sohrabji Godrej Green Business Centre and The ITC Maurya.
- 2) The definition is given in section 1.7 of this unit and some benefits are reduction in air and water pollutants, rainwater retention and ground water recharge, control of soil erosion and improve in soil quality, improved habitats for wildlife, habitat connectivity, landscape permeability, etc.
- 3) This answer will require your interest in section 1.8.



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UNIT 2 ENVIRONMENTAL MANAGEMENT SYSTEM STANDARDS

Structure

- 2.0 Introduction
- 2.1 Objectives
- 2.2 Core Elements of Environmental Management System (EMS)
 - 2.2.1 Prerequisite Factors for EMS
- 2.3 Benefits and Limitations of EMS
- 2.4 Certification Body
- 2.5 Assessment of EMS
- 2.6 Documentation of EMS
- 2.7 EMS Standard: ISO 14000 Series
- 2.8 Let Us Sum Up
- 2.9 Key Words
- 2.10 References and Suggested Readings
- 2.11 Answers to Check Your Progress

2.0 INTRODUCTION

All organisations like companies, big and small institutions, industries etc. have some impact on environment. Environmental Management System (EMS) is similar to other management systems, like as those that manage quality or safety. It assesses an organization's business strengths and weaknesses, helps them to make out and manage significant environmental impacts, saves money and resources by increasing efficiency, ensures compliance with environmental laws and provides targets for improvements. As per United States Environmental Protection Agency (USEPA, 2017), an EMS is a set of processes and practices that facilitate an organization to reduce its environmental impacts and increase its operating efficiency. It is a framework that helps a company/organization to achieve its environmental objectives through regular review, evaluation, and improvement of its environmental performance. Regular planning, implementing, reviewing and improving the processes and actions in EMS will identify opportunities for improving and implementing the environmental performance of the organization. By getting EMS certification, the organization can show to its customers about the commitment in meeting environmental responsibilities. EMS does not dictate to achieve a particular level of environmental performance rather each organization's EMS is tailored or customised to its own individual objectives and targets. Ideally, an EMS supports resource sustainability, environmental protection, biodiversity conservation and ecologically sustainable development.

A properly designed EMS should follow the "Plan Do Check Act" cycle which is based on the principle of continuous improvement where:

- Planning involves identifying environmental aspects and establishing aims.
- Implementing (Do) includes training and operational controls.
- Checking incorporates monitoring and corrective measures.
- Reviewing (Act) includes regular progress review and action to incorporate required changes in the EMS.

2.1 OBJECTIVES

After studying this unit you should be able to:

- define environmental management system;
- describe core elements of EMS;
- explain EMS assessment; and
- compare benefits and limitations of EMS.

2.2 CORE ELEMENTS OF ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

There is no single approach which can be considered the best for the development and implementation of EMS, since it depends on the nature, extent and types of activities, products and services within the company. The core (principal) common elements of EMS are:

- **Environmental Policy:** It is the guiding principle of an EMS. In simple words, it is a statement of an organization's commitment to improve its environmental performance. An environmental policy is a written statement outlining organisation's mission in relation to managing the environmental impacts of its operations. The policy is the driving force behind the objectives, targets and management programme of company EMS.

There is no perfect way or rules to design a policy document - it will depend on type, needs and process in a company and the particular needs of that company. However, there are some key elements which one must consider and include during policy formation like:

- a) Commitment to continual improvement of organization environmental performance
- b) Outline of the legislation organization for compliance and plan of action
- c) Expectations from employees within the policy
- d) Implementation of the policy, its management and review

The EMS policy should:

- state the organisation's aims and objectives
- endorse and be actively supported by senior management
- accepted by staff.

Environmental Standards

- allow management to communicate its aims and objectives to employees and other interested parties, including shareholders, customers and suppliers.
- should be a part of the business strategy.

For organisations intending to implement a formal EMS including ISO 14001 and Eco-Management and Audit Scheme (EMAS), the environmental policy is a mandatory document providing a cornerstone in the system's development and implementation.

The written policy needs to:

- 1) be specific to organisation and its environmental impacts.
 - 2) only address issues relevant to company's business activities.
- **Planning:** EMS planning involves:
 - a) Developing a plan to fulfill Environmental Policy
 - b) Identifying environmental aspects and impacts
 - c) Identifying regulatory and other requirements (including legal requirements of particular state or country)
 - d) Developing objectives and targets
 - e) Developing environmental programs
 - f) To identify environmental aspects a company may select different activities, services, and products.

The aspects that are associated with activities, services and products of a company/organization/enterprise and must give consideration are:-

- extraction and distribution of natural resources and raw materials;
- manufacturing processes;
- design and development;
- packaging and transportation;
- environmental performance and practices of suppliers;
- supply, use and end-life of products;
- waste management and wildlife and biodiversity.

Activities/services/products included in identification of environmental aspects and impacts can be:-

- air emissions,
- waste and waste water releases to water and land,
- natural resources and raw material utilization,
- energy use, energy emitted in the form of heat,
- radiations etc. by products and physical aspects (appearance, size, shape and colour).

Legal and regulatory requirements subscribed by a company comprises of local/ departmental/ regional/state/national and international requirements e.g. agreement with public authorities, customers, community groups and NGO's; voluntary environmental labelling, trade associations rules, public commitments and company requirements.

To achieve specific level of environmental performance a company should establish objectives and targets. These objectives and targets (both short and long term) must be clear, quantifiable, and consistent with the environmental policy of an organization. Environmental objectives are the overall aims that a company will improve itself through EMS, for example, to reduce electricity consumption by 25 % over the next five years. On the other hand, environmental target is the short term goal to achieve environmental objective. For example, to reduce electricity consumption by 10% in first year is a short term goal leading to the environmental objective. There can be several targets of an objective, for example, to achieve 25% electricity consumption reduction in five years the company can set the target to reduce electricity consumption by 10% in first year, make a policy to change incandescent lights with LED ones, to increase boiler/heater/thermal efficiency, computer control of the heating system, shift to new raw material or shift to new energy renewable source.

- **Implementation and Operation:** To implement EMS successfully in an organization needs:
 - a) Framework of the activities and assigning responsibilities to the organizations members/employees, administration and top level management. The management shall ensure the availability of different resources required for the successful implementation and operation of EMS. The different types of resources required could be skilled man power, technology, finance and infrastructure.
 - b) Arranging proper training, creating awareness and competence among the people enrolled
 - c) Proper communication between each level of participants. Internal communication can be established among the different levels and functions within the organization and external communication can be established with external related and interested organizations.
 - d) Documentation of every point starting from responsibilities to challenges observed and control mechanisms to achieve EMS. The documents required for EMS can be “controlled” which means that documents and records must be approved, reviewed, updated, and legible.
 - e) Operational control where various processes related to environmental objectives and policy must be performed under specific circumstances, operating criteria with proper maintained procedures.
 - f) Emergency preparedness and response should be done, implemented and maintained by the company in order to avoid any emergency situation/ accidents. Emergency plan consisting of clear and visible labelling of exit/ evacuation routes, fire extinguishers, fire/gas leakage alarms, contact details of medical aid, clean-up services, fire department must be done and maintained at proper places in the organization.

- **Integration of Environmental Concerns:** The integration of environmental management into regular operations means the preparation of course of action for incorporating environmental measures into other operational aspects such as purchasing, research and development, product development and acquisitions, marketing, finance, protection of workers etc., in the case of companies and the health and safety and community welfare in case of a local government.
- **Checking:** Checking is done to know organization progress to achieve environmental goals of EMS through monitoring and assessment, keeping records, and auditing. It also includes corrective and preventive action taken by the organization. Monitoring and measurement includes assessment of current environmental performance, identify root causes of any problems (if any), point to areas that need corrective action, and ultimately improve performance and increase efficiency in a company. Once the key operations and activities, that could have potential significant impact on environment are identified, one must:
 - a) maintain procedures to track key characteristics of these operations.
 - b) track performance and conformance with environmental goals.
 - c) calibrate and maintain any monitoring tools and equipment.
 - d) formally review compliance with applicable rule and regulations and other requirements.
- **Management Review:** Any change of raw material, process, product, or services and their potential environmental impacts should be reviewed properly. Management involvement is important to the success of an EMS. The management review allows senior management to consider the effectiveness of the EMS and any changes necessary. It is a formal evaluation of the status and adequacy of the organisation's environmental policy, systems and procedures in relation to environmental issues, regulations, changing circumstances and continual improvement. Additionally, management needs to focus how resources are being utilized and where additional resources are required.

The management review should cover:

- a) Environmental performance and progress in achieving objectives and targets.
- b) Compliance (in agreement) with legislation.
- c) Results of internal audits and reports.
- d) Status on actions required in connection with non-compliances.
- e) New processes and any changes to known environmental issues.
- f) Any changes in operating requirements, technology, organization legislation, third-party requirements such as customers, suppliers, stakeholders and regulators or in response to complaints.
- g) Effectiveness of training.
- h) Need for any revisions to environmental policy, objectives and targets.

- i) Follow-up actions from previous management reviews.
- j) Recommendations for improvement.

The review process can take a period of time with different elements being reviewed independently. Reviews should include audit outcomes, evaluation of reaching objectives and targets, evaluation of appropriateness of the EMS and concerns from interested parties. Management review meetings should be attended by those having executive or specialist responsibilities, site director or most senior manager, the management representative and line managers with defined responsibilities.

1.2.1 Prerequisite Factors for EMS

The three components necessary to start an EMS are:

- i) **Raise Awareness of Management:** Management commitment is a crucial pre-requisite for a successful EMS. The commitment comes after management is well informed about the costs and benefits of implementing an EMS.
- ii) **EMS Team Appointment:** Appointment of an EMS team reflects management's support and commitment to provide resources. EMS team members should include expertise in different fields such as facility operations, maintenance, risk management, manufacturing, human resources, engineering, finance, and quality control. Members should be dedicated employees, who are genuinely interested in the EMS, and open to implementing change.
- iii) **Create an Environmental Policy:** Creation of an environmental policy is essential as a guide for EMS facility. The policy must be simple so that all employees can understand it, but enough inclusive to cover proper components. An EMS environmental policy must contain at least the three commitments to promote pollution prevention, comply with relevant environmental laws and regulations and focus on continual improvement. According to Arizona Department of Environmental Quality (2014) some of the examples of EMS environmental policy could be:

“We will prevent pollution at the source. When waste cannot be avoided, we are committed to recycling, treatment and disposal in ways that minimize undesirable effects on air, water and land.”

Or

“We will train our employees to be environmentally responsible at work and at home and will also communicate our commitment to environmental stewardship to our vendors, customers, and surrounding communities – and solicit their input in meeting our environmental goals.”

Or

“We pledge to reduce our use of toxic substances and to minimize the generation of hazardous wastes whenever feasible.”

Or

“Our industry is committed to producing products and services with the least possible impact on the environment. We plan to do this by implementing

pollution prevention, complying with relevant environmental laws and regulations, and seeking ways to continually improve our business practices so that we minimize our impact on the environment.”

2.3 BENEFITS AND LIMITATIONS OF EMS

An EMS ensures that an organisation knows its environmental risks and manages them in a systematic manner. The benefits of implementing EMS are:

- a) **Better Regulatory Compliance:** running implementing an EMS will helps in ensuring that environmental legal responsibilities are met and managed more easily on a day-to-day basis.
- b) **More Effective Use of Resources:** EMS policies and procedures help the organization in more effective management of waste and resources and reduce costs. Waste reduction can save the organization money by reducing labour costs (to handle and dispose wastes) and waste control equipments/techniques and increases potential liability of the company.
- c) **Marketing:** Running an EMS will prove company business' credentials as an environmentally aware operation that shows company commitment towards continual environmental improvement.
- d) **Finance:** It become easier to raise investment from banks and other funding institutions which are interested to see businesses controlling their environmental impacts. Further, a company can make tangible savings through low-cost housekeeping measures systematically implemented through the adoption of an EMS can reduce costs for energy, fuel, water, raw materials, wastewater treatment, and waste disposal.
- e) **Increased Sales/Trade Opportunities:** Many reputed and branded companies/businesses and government departments may deal only with those businesses having an EMS, thereby providing more opportunities for trade. Some environmental conscious customers will prefer to buy the products of those brands having either less environmental impacts or showed their commitments towards environmental conservation. Eco labels of recycling, having ISO 14000 tag, and self declaration by the company are some of the means by which customers knows company commitment for environment.
- f) **Lighter Regulation:** even though EMS is not a regulatory requirement, but by showing commitment to environmental management, an organization may benefit through less frequent site visits or reduced fees from environmental regulators.
- g) **Pollution Prevention:** Improved environmental performance helps in resource conservation and reduces different emissions in the environment.
- h) **Risk and Liability Control:** Reducing or eliminating pollution incidents through design and implementation of effective controls helps in reducing risks and liabilities in a company. This may increase the attractiveness of the organization as a low-risk investment.
- i) **Changes in Environmental Attitudes and Awareness:** Internal communication on environmental performance and training has a positive

effect on employee motivation and build the organization's reputation as a good employer, with positive impacts on human resources management and quality. Continual improvement commitment in environmental performance conveys a strong message to important external stakeholders, such as local authorities, regulators, and the local community, that the company uses good practices and is a good corporate citizen.

- j) **Other Benefits:** EMS enhances employee morale and its image with public, policy makers, lenders, and investors. In short EMS improves the reliability and credibility of an organization environmental policy.

Limitations of EMS

An EMS is a tool that works when an organization puts time and effort into its implementation. Simply establishing an EMS does not guarantee better performance. Further, having an ISO-14001 certification does not prove that a company's environmental performance is good.

Check Your Progress 1

- Note:** a) Write your answer in about 50 words.
b) Check your progress with possible answers given at the end of the unit.

1. Mention the qualities of a well designed EMS?

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2. Name the core elements of EMS.

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3. Mention the three components necessary to start an EMS.

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4. Write the main benefits of having EMS in a company.

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5. Name the three basic commitments of an EMS environmental policy.

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6. Mention the different resources required for the successful implementation and operation of EMS.

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2.4 CERTIFICATION BODY

It is not a legal requirement to get EMS independently certified but it can be good and advantageous for an organization if the company gets an EMS certification. Having an externally certified EMS reflects seriousness of a company's towards environmental performance and it can be a powerful marketing and sales tool. There are a number of environmental standards mentioned below to which a company can get EMS certification.

- A. ISO 14001:** ISO 14001 is the internationally recognised standard for EMS. Having ISO 14001 can provide suppliers and customers with high-profile and respected assurance that they are managing their environmental responsibilities. As per National Accreditation Board for Certification Bodies (NABCB, 2017), New Delhi there is eight certification bodies (Table 1) allowed to issue certificates for both ISO 14001:2004 and ISO 14001:2015 in India.

Table 1: Name of EMS certification companies in India

Sr. No.	Name and place	Validity up to
1	TUV SUD South Asia Pvt. Ltd., Bengaluru and Gurugram	April, 2018
2	International Certifications Services Pvt. Ltd., Mumbai	August, 2018
3	DNV GL Business Assurance India Pvt. Ltd., Mumbai	June, 2020
4	Vexil Business Process Services Pvt. Ltd., New Delhi	June, 2020
5	Integrated Quality Certification Pvt. Ltd., Bengaluru	September, 2020
6	Bureau of Indian Standards, New Delhi	March, 2021
7	IRCLASS Systems and Solutions Private Limited (Operating certification services through its Division Indian Register Quality Systems), Mumbai	April, 2021
8	Bureau Veritas (India) Pvt. Ltd., Mumbai	April, 2021

Source: NABCB, 2017, http://www.qcin.org/nabcb/accreditation/reg_bod_ems.php

There are about 175 Indian companies located in major cities, which provides consultancy to achieve various aspects of environmental management especially ISO: 14001.

- B. EMAS:** EMAS is a voluntary European scheme that provides external recognition for those businesses that prove that they go further than just meeting regulatory requirements for environmental issues. To gain EMAS verification a company/organization must be able to prove that he has identified and is working with all relevant legislation and have systems in place to do so on an ongoing basis. The company needs to also prove that his system meets the ISO 14001 standard. It is possible to gain and maintain both ISO 14001 certification and EMAS verification at the same time.
- C. BS 8555:** BS 8555 is a British standard that provides directions for implementing an EMS on a phase-by-phase basis and it can be a good approach of working towards either ISO 14001 or the Eco-Management and Audit Scheme (EMAS). A company can gain independent recognition for his efforts to follow BS 8555 by using *Acorn*, *Green Ticks* and *Seren* (any one) accredited schemes of United Kingdom Accreditation Services (UKAS). Acorn, is run by the Institute of Environmental Management and Assessment (IEMA), and focuses on environmental improvements that are linked to business competitiveness and is flexible so that all types of organisation, regardless of their size, can participate. Green Ticks, which is run by the Green Business Partnership is a unique to Scottish businesses and organisations and is recognised throughout the UK and Ireland. Seren is managed by Tarian Inspection Services.

2.5 ASSESSMENT OF EMS

The EMS focus on about the action needed to meet organization/company environmental goals, about the tools (training, procedures, and resources) required to meet them, and reviewing the progress so that one can continue to get closer and closer to the goals. It can be carried out itself by the company as it provide a clear picture about what already exists and where improvement is required for EMS. The assessment can be carried through following methods:

i) **Monitoring and Assessment:** The motivation for monitoring and measurement is to assess company's current environmental performance, identify main causes of the problems if exist, aim areas that need corrective action, and ultimately improve performance and increase efficiency. As the key operations and activities that could potentially significantly impact the environment are identified, one has to maintain procedures to track key characteristics of these operations i.e.

- Track performance and conformance with environmental goals.
- Calibrate and maintain the monitoring devices.
- Review the compliance with applicable regulations and other requirements.

For this there is a need to do some monitoring for health and safety, quality assurance and regulatory compliance. Process measures includes the identification of activities that occur in the process, such as the amount of material used per production unit or the energy or time or associated with a particular activity. Outcome measures focus on the results or by-products from a process, such as the amount of waste generated per production unit or the level of pollutants in the wastewater. Process measures are

“leading” indicators and outcome measures are “lagging” indicators. The number of manpower trained in spill prevention is a process measure, while the number of spills is an outcome measure. Generally a combination of processes and outcome measures are helpful to track performance in an organization.

ii) Non-conformance and Corrective and Preventative Action: It can be carried out through:

- Investigating the problems or non-conformities.
- Identifying the root causes.
- Identifying and implementing of corrective actions.
- Documenting and tracking of corrective actions.

EMA is carried out by the company itself, then someone has to assign the responsibility and designate some authority to track non-conformance and assure corrective action. Corrections should be done as quickly as possible. People in affected areas (if any) should be promoted to report existing and potential problems.

iii) Records: Records assessment is necessary to assure reliability and regularity about the EMS in the company. Well maintained, updated and easily accessible records showed company commitment to achieve and maintain EMS. The records will be useful if maintained appropriately, legible, identifiable, and traceable to the operation involved and need to be maintained and stored properly for their easy readily accessibility.

iv) Audit: An audit is a good tool to assess the EMS. Audits can be carried out both internally or by an external agency. Usually internal audit is before an external audit so that a company will know its weakness and strengths. The audits should let us know whether system is effective (covers all areas) and is being properly maintained. The audit results need to be informed to the affected personnel's and those responsible for maintaining the EMS. An EMS audit is to assess about system functioning, to keep people informed, to collect information, and to correct nonconformities. Information is regarding providing the environmental performance to the decision makers and improvement in EMS can be about management, operation, process design, product design and services improvements are required? Generally auditing comprises of inspections, enforcement actions, checking of discharge limits, reportable spills and releases, and quantities of waste generated and disposed.

v) Management Review: This is the final step needed for the continuation of improvement cycle for EMS. Management participation is essential for the success of an EMS in providing an oversight to assure EMS functioning, and to check whether the company's objectives and targets are properly addressed. Management also keep check on resources utilization and further additional requirements of resources if any. The review process can take time as it includes independent review of different related aspects/elements. The reviews include evaluation of reaching objectives and targets, audit results, evaluation of appropriateness of the EMS and concerns from interested parties. The review should be documented, including any suggested changes and subsequent action. Changes can be regarding raw materials, processes, product line, or services.

2.6 DOCUMENTATION OF EMS

Basically in “Plan Do Check Act” cycle, documentation deals with preparing and maintaining records which are associated with under “Do” sub-unit. To establish an EMS, different types of documents related to policy, procedures, work instructions, several guidelines, manuals, standard operating practice records and forms are used. When a document was framed by the top management, this document comes first in the hierarchy, but if the document is filled by the employee, the document is found on the bottom of the pyramid in the hierarchy. An EMS proper documentation system is required to collect, analyse, register and retrieve information and it incorporates EMS structure and various responsibilities of personnel involved. It should be made available to all appropriate staff and should be kept up-to-date. Documentation provides directions for the users to access further materials/records as required for their work. The documentation should explain the EMS and make the relationship clear to any other management system in operation within the organisation. Documentation provides directions for the users to access further materials/records as required for their work. The documents for environmental and other management systems (such as for quality of safety and health) can be combined as long as the EMS can be clearly identified, together with the appropriate interfaces between different EMS documentations and the order of priority. Environmental effects must be included within safety reviews, operability studies and risk and hazard effect analysis, etc. In such cases, the EMS documentation should focus and include the critical areas where significant effects are covered by other management systems.

The EMS document covers and contains three points:

- i) Statement of purpose for each EMS element
- ii) Standard operating procedures
- iii) Forms, records and plans

Documentation should be readable, dated (should include modification date if any), signed by concerned manager and readily identifiable.

2.7 EMS STANDARD: ISO 14000 SERIES

ISO is the International Organization for Standardization, established in Geneva, Switzerland in 1946 to promote international trade by harmonizing standards. The need for international environmental management standards was assessed by the Strategic Advisory Group on the Environment (SAGE), a committee established by ISO in 1991. They recommended development of a standard and in January 1993, ISO created Technical committee 207 (TC 207) to develop the ISO 14000 series of 20 standards. TC 207 is composed of various subcommittees and working groups having representatives from the ISO member countries who contribute their input to TC 207 through national delegates. In 1992 the British Standards Institute published BS7750 which was the first national standard for environmental management systems. The British Standards Institute had previously published BS 5750, a national quality management system standard, which had a significant contribution to the development of ISO 9000. ISO 14001 was largely based on BS 7750; however it is not as stringent as BS 7750. The International Standards Organization (ISO)

has developed a series of environmental standards (ISO 14000) that prescribe the necessary elements for an EMS. ISO has setup international voluntary consensus standards for manufacturing, communication, trade, and management systems. If an organization/company adopts the standard, it makes a clear management commitment to an environmental policy. The company will form a plan to carry out the policy, identify activities that significantly impact the environment, and train employees in environmental practices. The ISO 14000 is discussed in detail in next Unit III.

Check Your Progress 2

- Note:** a) Write your answer in about 50 words.
b) Check your progress with possible answers given at the end of the unit.

1. Name some environment standards of EMS.
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2. Write names of some Indian certification companies allowed to issue certificates for both ISO 14001:2004 and ISO 14001:2015 in India.
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3. Mention different methods to assess EMS.
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4. What are the various activities included in EMS audit?
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5. Which document comes first and at bottom in the documentation hierarchy of EMS?
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2.8 LET US SUM UP

In this unit, we have understood core elements, prerequisite factors, documentation, assessment and benefits and limitations about EMS. We got the knowledge about certified companies in India for EMS. In conclusion, EMS companies will show

their commitments towards environment as well compete on international level in term of business. Many leading, medium and even small companies and organizations in India as well as abroad have adopted different EMS standards along with Occupational Health and Safety standards and saved their resources, reduced wastes and recieved recognition in their respective fields. As it is difficult to discuss the elaborative case studies in this chapter, for the student interests some websites are suggested as examples in References and Suggested Readings section.

2.9 KEY WORDS

- Audit** : An audit is an “independent and objective examination of whether practice complies (fulfils) with expected standards.
- Environmental Audit** : Defined as a basic management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organisations, management systems and equipment are performing.
- Environmental Management System** : A set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.
- Environmental Policy** : Is a written statement outlining organisation’s mission in relation to managing the environmental impacts of its operations.
- EMS Review** : It is a formal evaluation of the status and adequacy of the organisation’s environmental policy, systems and procedures in relation to environmental issues, regulations, changing circumstances and continual improvement.
- Non-conformance** : Failure to conform to accepted standards or a deficiency that seriously harms (weakens) the effectiveness of the EMS.

2.10 REFERENCES AND SUGGESTED READINGS

Arizona Department of Environmental Quality (ADEQ) (2014): Launching an Environmental Management System (EMS). Publication Number TM-14-01, pp: 1-79.

Kulkarni, V. and Ramachandra, T. V. 2006. Environmental Management. TERI Press, New Delhi.

National Accreditation Board for Certification Bodies (NABCB). (2017) List of Certification Bodies-EMS, available at: http://www.qcin.org/nabcb/accreditation/reg_bod_ems.php (accessed on 23.09.2017).

United States Environmental Protection Agency (USEPA). 2017. Environmental Management System (EMS) available at: <https://www.epa.gov/ems> (accessed on 28.06.2017).

WRAP. 2017. Your guide to environmental management systems, Business Resource Efficiency Guide. Available at: <http://www.wrap.org.uk/sites/files/wrap/WRAP%20EMS%20guide%20Mar2015.pdf> (accessed on 28.06.2017)

Suggested websites for case studies and success stories of EMS:

https://www.bsigroup.com/LocalFiles/en-IN/Case-studies/CFV_ISO_14064_Tata%20Global%20Beverages.pdf (01.10.2017)

<http://www.smetoolkit.org/sites/default/files/body-files/en/ABCCaseStudy1.pdf> (01.10.2017)

<http://www.smetoolkit.org/sites/default/files/body-files/en/XYZCaseStudy.pdf> (01.10.2017)

http://gpcb.gov.in/pdf/ENV_SOME_INITIATIVES_IN_GUJARAT.PDF (01.10.2017)

2.11 ANSWERS TO CHECK YOUR PROGRESS

Answers to Check Your Progress 1

Your Answers should include the following Points:

1. A properly designed EMS should follow the “Plan Do Check Act” cycle and is based on the principle of continuous improvement.
2. The core elements of EMS are environmental policy, planning, implementation and operation, integration of environmental concerns, checking and management review.
3. The three components necessary to start an EMS are to raise management awareness, appointment of an EMS team and to formulate an environmental policy.
4. The benefits of implementing EMS are better regulatory compliance, more effective use of resources, raise investment from banks, better business increased trade opportunities, pollution prevention, reducing or eliminating pollution and safety related incidents, and changes in environmental attitudes.
5. An EMS environmental policy must contain at three commitments i.e. of promote pollution prevention, comply with relevant environmental laws and regulations and focus on continual improvement.
6. The different resources required for the successful implementation and operation of EMS include skilled man power, technology, finance and infrastructure.

Answers To Check Your Progress 2

1. British standard (BS) 8555, ISO 14001 and EMAS (European scheme).
2. Indian certification companies allowed to issue certificates for both ISO 14001:2004 and ISO 14001:2015 in India are: i) International

Certifications Services Pvt. Ltd., Mumbai, ii) Bureau Veritas (India) Pvt. Ltd., Mumbai, iii) Integrated Quality Certification Pvt. Ltd., Bengaluru, iv) Bureau of Indian Standards, New Delhi, and v) Indian Register Quality Systems), Mumbai.

3. Different methods to assess EMS can be monitoring and assessment, non-conformance and corrective and preventative action, records, EMS audit and management review.
4. The EMS audit comprises of inspections, enforcement actions, checking of discharge limits, reportable spills and releases, and quantities of waste generated and disposed.
5. The document framed by the top management comes first in the hierarchy and the document filled by the employee will comes at the bottom of the pyramid in the hierarchy.



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UNIT 3 EMS STANDARDS ISO 14000

Structure

- 3.0 Introduction
- 3.1 Objectives
- 3.2 Evolution, Principles and Structure of ISO 14000
 - 3.2.1 The Plan Do- Check-Act (PDCA) cycle
 - 3.2.2 Benefits of ISO14001
- 3.3 EMS Specification Standards ISO 14001
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 - 3.3.3 Significance of ISO 14001
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3.0 INTRODUCTION

International Organization for Standardization (ISO), comprising 160 national standard bodies is coordinated by central secretariat situated in Geneva, Switzerland. The ISO has established to work in direction of boosting the advancement of standardization, promoting international exchange of goods and services. ISO 14000, as family of standards was developed by ISO/TC 207, Environmental Management Committee and various sub-committees. ISO 14000 includes 21 published standards subjected to managing environmental issues across the world. ISO/TC 207 and ISO/TC 176 (Quality Management and Quality Assurance) works together to run the process in systemic manner.

The ISO 14001 defines requirements for an effective Environmental Management System (EMS) in ISO 14001 series subjected to guidelines followed by organization. The fundamental elements of ISO 14001 includes “Plan: Do: Check: Act” (PDCA) cycle which ensures development, continuous improvement and control of the management system. The ISO 14001 has been formulated appropriate for any organization. EMS models have its impact in managing environmental systems including models EMAS, ACC, DOJ, NEIC, EPA but ISO 14001 is widely accepted and there are 2000 certified organizations under ISO 14001. There are several benefits of implementing EMS in sectors such as operation, marketing, environment, finance, likewise ISO 14001 carries benefits to its users in different sectors.

The Occupational Health and Safety Assessment Series (OHSAS) 18001 is compatible with ISO 9001 (Quality) and ISO 14001 (Environment) in managing system standards. The OHSAS 18001 has its own benefits in terms of flexibility, voluntary in nature, specific performance, its international recognition and much more. The Integrated Management Systems (IMS) has been developed with clear objective to minimize duplication of procedures and working processes.

3.1 OBJECTIVES

After studying this unit, you should be able to:

- explain ISO, ISO 14000 and EMS;
- explain Plan-Do- Check-Act (PDCA) cycle;
- list of ISO family standards;
- list various Benefits of Implementing ISO 14001;
- explain OHSAS 18001; and
- describe Integrated Management system.

3.2 EVOLUTION, PRINCIPLES AND STRUCTURE OF ISO 14000

The International Organization for Standardization (ISO), is located in Geneva, Switzerland. It is a worldwide union of 160 national standard institutes from almost all kinds of countries. The main motive of ISO is to boost the advancement of standardization and associated activities throughout the world, carrying a vision to promote international exchange of goods and services along with facilitating alliance in the fields of intellectual, scientific, technological and economic activity. The outcome of the technical work done by ISO leads to the development of ISO standards also known as International Standards. ISO has developed more than 18000 standards complying with the three main dimensions of sustainable development: economic, environmental and societal. With time, changing requirements and emerging environmental issues, all ISO standards are reviewed and revised frequently in order to keep them remain relevant to the end-users.

Table 3.1: Evolution of ISO

Year	Event
1947	ISO Founded in Geneva
1951	ISO's first standard was published, i.e. ISO/R 1:1951 Standard reference temperature for industrial length measurements
1955	3rd General Assembly at Stockholm. At the beginning of 1955, ISO has 35 members and 68 standards (recommendations). Henry St Leger is the Secretary General.
1960	International System of Units (SI) – ISO 31 (replaced by ISO 80 000).
1961	DEVCO established in 1961, a committee for developing country matters and in 1968 introduces Correspondent membership. This allows developing countries to be informed of International Standardization work without the full costs of ISO membership.
1971	Two technical committees were constituted in the field of environment, 1. Air quality and 2. Water quality.
1970's	During this period ISO's Secretary General OlleSturen focuses on turning ISO into a truly international organization.
1987	Published its first quality management standard "ISO 9000 family" which addresses various aspects of quality management and contains some of ISO's best-known standards.
1995	ISO digitalized
1996	Launched environmental management system standard, ISO 14001.
2005	ISO and IEC's joint technical committee JTC1 launched ISO/IEC 27001, a management system standard on information security.
2008	ISO jointly with ITU and IEC received Emmy Award for work producing an advanced video coding standard.
2010	Launched ISO 26000, the first International Standard providing guidelines for social responsibility.
2011	Launched ISO 50001, International Standard providing guidelines for energy management.
2016	Published powerful new tool, ISO 37001 - the first international anti-bribery management system standard to combat bribery
2017	Completes 70 years

Source: www.iso.org

Before 1987, ISO developed traditional standards but in 1987, ISO 9000 was established which laid the foundation for the quality standards, and with time ISO standards gained importance among nations in and outside of European Union for business communications. In 1993, ISO constituted the Technical Committee 207 on Environmental Management aiming to develop international standards for environmental management tools and systems.

ISO/TC 207, Environmental management, the technical committee of ISO, has developed ISO 14000 family of standards which comprise of 21 published standards. These standards provide a common framework to effectively manage environmental issues related to organizations across the world. These guidelines promise to effect a broadly based improvement in environmental management, which in turn can facilitate trade and improve environmental performance worldwide.

ISO/TC 207, work in close proximity with ISO/TC 176, Quality Management and Quality Assurance, the ISO's technical committee which developed ISO 9000. The following areas are covered under the scope of ISO/TC 207 documents:

1. Environmental management systems
2. Environmental auditing and related environmental investigations
3. Environmental performance evaluation
4. Environmental labelling
5. Life cycle assessment
6. Environmental communication
7. Environmental aspects in product standards
8. Terms and definition
9. Greenhouse gas management and related activities
10. Measuring the carbon footprint of products

ISO/TC 207 operate along with 30 international organizations. Some of these organizations include:

1. Asian productivity Organization
2. Confederation of European Paper Industries
3. European Commission
4. Environmental Defense Fund
5. Global Ecolabelling Network
6. International Chamber of Commerce
7. International Institute For Sustainable Development
8. International Iron And Steel Institute
9. Organization For Economic Co-operation And Development
10. Sierra Club, 12. United Nations Environment Programme
11. World Business Council For Sustainable Development
12. World Health Organization
13. World Resource Institute
14. World Trade Organization

Bureau of Indian Standards (BIS) is also a founder member of ISO, representing India during the technical meetings of the technical committee of ISO/TC 20, in which experts from industry and BIS officers take part. ISO 14000 is also named as IS/ISO 14000 according to BIS. BIS also provides certification courses to any organization that applies for a set of standards, such as IS/ISO 14001. However, there are five key principles that cover the family of 14000 standards:

- Principle 1- Commitment and Policy
- Principle 2- Planning
- Principle 3- Implementation
- Principle 4- Measurement and Evaluation
- Principle 5- Review and Improvement

3.2.1 The Plan-Do- Check-Act (PDCA) Cycle

Like all other ISO management systems standards, ISO 14000 is developed with the same Plan-Do- Check-Act (PDCA) cycle.

Table 3.2: ISO 14000 Family of Standards

ISO 14001	Framework for environmental management systems (EMS)
ISO 14004	Additional guidance and useful explanations for ISO 14001
ISO 19011	Useful for EMS and quality management system audits
ISO14031	Guidance on how an organization can evaluate its environmental performance.
ISO 14020	Series of standards address a range of different approaches to environmental labels and declarations.
ISO 14040	Guidelines on the principles and conduct of Life Cycle Assessment studies
ISO 14064p arts 1, 2 & 3	International greenhouse gas (GHG) accounting and verification standards
ISO 14065	Complements ISO 14064 by specifying requirements to accredit or recognize organizational bodies that undertake GHG validation using ISO 14064
ISO 14063	Guidelines on environmental communication
ISO Guide 64	Guidance for addressing environmental aspects in product standards
*ISO 14045	Provide principles and requirements for eco-efficiency assessment
*ISO 14051	Guidelines for general principles and framework of material flow cost accounting (MFCA)
*ISO 14067	Guidelines for the quantification and communication of greenhouse gases (GHGs) associated with products
*ISO 14069	Guidance to calculate the carbon footprint of the products, services and supply chain

*ISO 14005	Guidelines for the phased implementation of an EMS to facilitate the take-up of EMS by small and medium-sized enterprises
*ISO 14006	Guidelines on eco-design
*ISO 14033	Guidelines and examples for compiling and communicating quantitative environmental information.
*ISO 14066	Specify competency requirements for greenhouse gas validators and verifiers.

* New Standards (Source: www.iso.org).

The development programme of ISO/TC 207 is constantly evolving, driven by market needs. With time, requirement and emerging environmental issues, all ISO standards are reviewed and revised frequently to make sure they remain relevant to the marketplace.

The latest revision published is ISO 14001:2015. These revised guidelines are in order to latest trends, including the increasing recognition by companies of the need to factor in both external and internal elements that influence their environmental impacts, such as climate volatility and the competitive context in which they work. These revised guidelines are designed to make compatible with other existing management system standards (ISO, 2015). Implementation of ISO 14001:2015 may be in whole or partial. But, claims of conformity to ISO 14001:2015 are not acceptable unless all its requirements are incorporated into an organization's environmental management system and fulfilled without exclusion.

3.2.2 Benefits of ISO 14001

In order to obtain the complete benefit of ISO 14001, an implementing organization is required to give great attention to all the possible area and activities which may have an environmental impact. By doing so, the organization can obtain following benefits:

1. Reduced cost of waste management through the reduction of waste stemming from increased recycling within the organization.
2. Reduced consumption of energy and raw materials and better use of natural resources.
3. Improved corporate image amongst regulators, customers, and the general public.
4. Increased employee morale within the company as employee participation is integral to the success of such a commitment.
5. A framework for continual improvement of the organization's environmental performance.
6. The use of an international registration mark portraying the organization's environmental commitment, which can lead to increased opportunities with suppliers, clients, and government organizations.

3.3 EMS SPECIFICATION STANDARDS ISO 14001

Dear Learners, let us now read about EMS Specification Standards ISO 14001 in the following sentences:

3.3.1 EMS and ISO 14001

Managing natural resources in a sustainable way is considered as main criteria, which determine the fate of our earth and human beings. In order to fulfil the increasing demand of growing population natural resources is utilized in a nonscientific manner which is responsible for environmental problems at global level such as global warming, ozone depletion etc. In order to handle the emerging environmental issues, several schemes and standards were developed and implemented at international level.

Environmental Management System (EMS) is primarily used to address the impact of an organization on the environment. It helps identify, manage, monitor and control their environmental issues in a “holistic” manner thereby improving their environmental performance through the more efficient use of resources and reduction of waste, gaining a competitive advantage and the trust of stakeholders.

In general, an EMS should be based upon an organization’s documented environmental policy and contain the following characteristics:

1. Goals, methods, and a timeline for meeting environmental requirements and voluntary undertakings.
2. Procedures for maintaining appropriate documentation relating to its goals.
3. A defined structure and the responsibilities for each task along with the availability of adequate resources.
4. Corrective and preventative actions as well as emergency procedures.
5. An employee-training plan with periodic updates to define goals of the EMS, responsibilities, and risks.
6. A plan for periodic auditing of the organization’s performance in achieving the goals and how well the EMS helps the organization to achieve those goals

(Cascio 1996; Matthews 2001; Stapleton et al. 2001; Christin et al., 2004).

The ISO 14001 is the international standard that specifies requirements for an effective EMS in ISO 14000 series. It provides an outline that an organization can adopt and follow, rather than establishing environmental performance requirements. The ISO 14001 standard defines an EMS as “*a management tool enabling an organization of any size or type to control the impact of its activities, products or services on the environment*”. The ISO in 1996, launched the international voluntary standard ISO 14001:1996 “Environmental Management Systems - Specifications with Guidance for use.” In 2004, it was revised and updated by ISO with the title “Environmental Management Systems- Requirements with guidance for use.”

The ISO 14001:2004 - Environmental Management Systems (EMS) Standard has been developed to help organizations identify, manage and control the activities that have an environmental impact. It is adopted by Industrial companies, service organizations, utility and public bodies worldwide.

There are several benefits for a company which is carrying out the implementation of an effective EMS. Some benefits are as follow:

- Improved regulatory compliance requirements.
- Open markets and reduced trade barriers.
- Reduction in liability and risks.
- Enhanced credibility among customers and peers.
- Reduction of harmful impacts to the environment.
- Prevention/reduction of pollution and waste, many times resulting in cost savings.
- Improvements in site and project safety by minimizing injuries related to environmental spills, releases, and emissions.
- Improved relationships with stakeholders such as government agencies, community groups, and investors.
- Establishment of a system for continued environmental improvement.

3.3.2 Fundamental Elements of ISO 14001

According to ISO 14001, the concern for the environment should be concentrated on the surroundings in which the organization operates such as air, water, land, flora, fauna and human interactions. The clear definition and differentiation between activities, associated aspects and the resulting environmental impacts are very crucial to any effective environmental management system. For successful implementation of environmental management system, the above aspects should thus be dealt with greater significance.

The fundamental of all ISO management system standards lies in “Plan:Do:Check: Act” (PDCA) cycle. The cycle ensures development, continuous improvement and control of the management system in question.



Fig. 3.1. Flow diagram of ISO Management system standards

Plan: Implementation of Environmental Management System according to of ISO 14000 guidelines.

This is the first step to getting certified with the ISO 14001 Environmental Management Standard. The objective is to define an environmental policy and establishing good environmental performance. Like with other ISO management systems, it is important for a given organization that managers must be fully focused and driven to achieve the relevant requirements. The identification of operations that interact or might interact with the environment in the future is where the management team should start. The interactions will either be direct (as in the manufacturing industry) or indirect (as in the primary sector like raw materials). In order to be successful, the goals and targets coming from the management team have to be measurable so they can be reviewed and improved by organization's internal audits.

Do: Conducting Life Cycle Assessment and Managing Environmental Aspects

The PDCA process involves the implementation of the system in the second stage which has been planned by the management in the first stage. The implementation of an EMS involves conducting a life cycle assessment and managing environmental aspects and greenhouse gases. This stage also involves defining the resources and the members of your organization that is responsible for maintaining and control of various processes that are put in place. The members responsible for such processes should be trained and should have documentation for all procedures and processes including operational and documentation control and emergency procedures and responses.

Check: Conducting Audits and Evaluating Environmental Performance

In this stage, internal audits are conducted and environmental performance measured periodically, which ensures that the given organization's objectives and targets are being met. The review also includes measuring the greenhouse gas (GHG) performance. The management team needs to ensure that the employees responsible for various processes are maintaining and monitoring them adequately. In order to make the whole audit system more effective, the organization should keep monitoring the requirements limited to key process characteristics. The ISO 14001 standard is compatible if the organization already has a quality system in place. Like other management system standards, there is a requirement to present documentation outlining the corrective and preventative actions for various setbacks or processes. This document ensures continuous incremental improvement and emphasizes the environmental mindset the organization needs on every level.

Act: Using and Maintaining the Environmental Management System through continuous improvement.

A planned management review has to be conducted in order to ensure continuous improvement. This involves:

- Evaluation of audits
- Ensuring the meeting of the organization's objectives and targets
- Ensuring the meeting of ISO 14001 requirements

- Devising improvements to the processes
- Evaluating changing circumstances such as legal requirements

The intention of ISO 14001:2004 is to provide a framework for a holistic, strategic and systematic approach to the organization's environmental policy, plans and actions. The recently revised guidelines of ISO 14001:2015 now requires:

- Environmental management to be more prominent within the organization's strategic direction
- A greater commitment from leadership
- The implementation of proactive initiatives to protect the environment from harm and degradation, such as sustainable resource use and climate change mitigation
- A focus on life-cycle thinking to ensure consideration of environmental aspects from development to end-of-life
- The addition of a stakeholder-focused communication strategy

The improvisation in ISO 14001 guidelines are also focused on expansion (more and more business areas should get covered by the implemented EMS), enrichment (more and more activities, products, processes should be involved in the EMS) and upgradation (improvement in structure and framework of the EMS through know-how gained by the business when dealing with environmental issues).

3.3.3 Significance of ISO 14001

The ISO 14001 standard defines an EMS as “*a management tool enabling an organization of any size or type to control the impact of its activities, products or services on the environment*” (ISO 2002). The ISO 14001 establishes a framework for managing (through the development of formal processes and procedures) the environmental aspects of an organization. The key elements of the standard are grouped into five major areas;

(1) Environmental policy, (2) planning, (3) Implementation and operation, (4) Checking and Corrective action, and (5) Management review.

A unique aspect of the system is that it is designed to be appropriate for any company, regardless of industry, size, location, and the level of their environmental responsibilities. The ISO 14001 is a voluntary, consensus-based, and market-driven standard (Kloepfer 1997).

The ISO 14001 requires:

- (1) Committing to comply with applicable legislation and regulations
- (2) Implementing a continual improvement process (ISO 1996).

Many firms go beyond the ISO 14001 EMS requirements by adding additional elements for reforms and public reporting of emissions beyond legal requirements. For these firms, ISO 14001 is viewed as necessary, but not sufficient, for effective environmental management (Matthews 2001).

Every industry and company provides information on their environmental programs on their website available to the public. Other information that is available includes toxic release inventory data, Occupational Safety and Health Administration statistics, and documentation on programs such as National Environmental Performance Track (NEPT). (Christini et al. 2004)

3.4 IMPLEMENTATION OF EMS CONFIRMING TO ISO 14001

The management of environment system might differ from each organization but mostly includes maintenance of wastes, energy consumption, transport and the materials used. While implementing the environmental management system the organization has to identify the significant impacts relevant to its business. The environmental management system should be built into the existing management structure rather than being a standalone system. The implementation of environmental management system should include the following steps:

- Initiation of environmental friendly policy
- Involvement of the person responsible for its coordination
- Formation of relevant legal and other requirements
- Recognition of actual and potential impacts on environment
- Continuous monitoring of the objectives and the progress of the objectives
- Constant review on improvement on performance.

3.4.1 EMS Models

There are several models have been framed for the environmental management systems out of these the ISO 14001 is the most well-known international standard. The other models are as follows

- EMAS: European eco-management and adult scheme
- ACC: American care council developed by responsible care model
- DOJ: US Department of Justice “Seven key compliance program elements”
- NEIC: EPA national enforcement investigation center “compliance focused” EMS

Out of all these models, the highly accepted and practiced one is ISO 14001 standard. This is more similar to the ISO 9001 quality management. ISO 14001, it helps in improving the organization’s environmental performances with respect to any applicable legislation. The new ISO 14001 has been published on September 2015, which includes several new updates. It has strengthened the commitments of top management and evaluating. There are more than 2,000 organization currently certified with ISO 14001. It also includes 155 countries participating in it. China and Japan holds the highest number of ISO 14001 certified organizations.

3.4.2 ISO 14001: 5 Major Steps to Register

1. **Gap Analysis:** This goes through the methods already followed by the organization to manage its environmental wastes and the frames the changes need to be made in order to meet the requirements of ISO 14001.
2. **Initial Implementation:** Development of implementation strategy which includes the need for third party registration if the company needs.
3. **Pre-registration internal audits:** Prior to the official registration of ISO 14001 there must be several internal audits and management review.
4. **Registration:** The EMS registration audit conformance of the company's EMS to match to the requirements specified in ISO 14001.
5. **Ongoing implementation:** Continuous improvement of EMS according to the need of the organization. It also depends on the product of the organization. The fluctuation in overall business has to be calculated.

3.4.3 Case Study on Implementation of EMS

Beers Skanska became the first construction firm in the United States to achieve ISO 14001 certification in July of 1999. Their environmental policy encompasses the following seven areas, 1. Regulatory compliance, 2. Prevention of pollution, 3. Conservation, 4. Emissions and effluents, 5. Ecology and habitat, 6. Hazardous and toxic substances, and 7. Communication.

The goals set up by Beers Skanska EMS:

1. Reduce solid waste by 30% by reducing material use and through recycling and reusing materials on-site.
2. Reduce energy use by increasing by 10% the number of projects per year that focus on energy reduction.
3. Reduce air emissions by increasing by 5% the number of projects per year that focus on air emissions.
4. Further, reduce air emissions by 30% through continuing to encourage alternative commuting methods for employees.

Beers Skanska implemented ISO 14001 EMS without government or client pressure. Instead, they chose to fulfill Skanska's environmental commitment and gain a competitive edge. The quality and quantity (about 200 projects at a time throughout the United States) of projects motivates Beers Skanska's subcontractors to meet their demands (Christini et al., 2004)

3.5 BENEFITS OF IMPLEMENTING ISO 14001

ISO 14001 environmental management systems are the most documented and developed environmental management systems in the world. Currently, there are over 2,000 certified organizations registered and benefiting from the supervision provided within the ISO 14001 standards. By implementing ISO 14001 certification one's organization can guarantee the stakeholders that the environmental management system (EMS) meets international industry specific environmental standards. Each and every corporation, whether large or small; industrial, manufacturing, services, or trade related have an impact on the environment and can hence benefit from the ISO 14001 certification.

3.5.1 How It Helps

- It recognizes and creates the significance of all your environmental impacts.
- It implements efficient operational controls to administer your environmental impacts.
- It advances the effective employment of natural materials.
- It builds you to take account of legal requirements while setting up, implementing and maintaining your ISO 14001 system.
- It ensures you to execute to complying with appropriate legal requirements.
- It makes you communicate significant information on legal and other requirements to employees and concerned parties.
- It illustrates that environmental impacts are the main concern.
- It restores the confidence of the stakeholders that best practice systems are in place.
- It makes sure you persistently develop your sustainable development.
- It exhibits that you are an ethical and credible organization.
- It is internationally recognized.
- It helps to set up long-lasting partnerships with customers and suppliers at home and abroad

3.5.2 Benefits of EMS Implementation

Cost saving is one of the major benefits in EMS. It allows identifying the possible efficient way to cut cost and improve the quality of the product. The benefits include

Operational benefits:

- Reduces pollution
- Less operating cost
- Makes the working place safer
- The change of process to give high-quality products
- Downsizing the cost of waste disposal, handling of waste, emissions, and discharges
- The development and the transfer of knowledge within the company

Environmental Benefits:

- Reduction in non- hazardous and hazardous waste
- Helps in conserving natural resources like gas, electricity, space and water.
- Pollution and the disposal of waste can be highly controlled.

Marketing Benefits:

- Assist in demonstrating the customers and the stock holders that firm meets the environmental expectations.

- The purchasing requirements meet the potential national and international standards.
- Equips with a competitive marketing tool.

Financial Benefits:

- It improves the relationship with insurance companies.
- Improves accountability and reduces risk
- Meet the expectation of stakeholders and customers
- Cost savings by the reduction of material and energy input

3.5.3 Major Benefits of ISO 14001

Apart from the apparent benefit to improving the environment, the complete system from top management to the grass root level should know why this is important for an organization. Not all of the benefits signify the same thing to everyone at an organization, but the followings are few of the key benefits,

Improving Image and Credibility

With the increasing awareness on environmental pollution, now consumers are more concerned about the environmental practices of the companies that manufacture the products they use. In order to assure the consumers that a company is managing the environmental impact is by adopting effective EMS guidelines (ISO 14001) through which the impact can be recognized and managed. This can improve the image of the company, help them to maintain a good public image, and improve community relations. Through this, they get better market share with the interested parties.

Help to Comply with Legal Requirements

By implementing ISO 14001 the company will be benefited by providing the details of structure for identifying, monitoring and complying with the diverse environmental needs. Furthermore, implementing ISO 14001 guidelines the company will assure the people about their environmental concern and impact management system.

Improvement in Cost Control

All organizations want to decrease costs – this is a fact of life in today's world economy. How implementation of ISO 14001 is going to help in reducing cost is really interesting. At first, the guidelines can be used to identify, control, and reduce a number of environmental incidents that occur, which can cost a company through accountability costs of fines, cleanup, and reparations. Further, the improvement in the features of the environmental management system will help in decreasing costs by working to conserve the energy and input materials.

Higher Rate of Success when Implementing Changes

While implementing or trying to create the improvements, it is always important to ensure that a company is working with accurate data, which is considered as a key element of the ISO 14001 standard. By incorporating the improvement activities in place, a company can significantly enhance the chances success by tracking the enhancement through good data collection.

Enable Quicker Improvement of Processes

An integral part of ISO 14001 requirements is a continual improvement, which can be used to help the company to shift from small improvements toward greater enhancements of organizational development. When people are involved in a culture that utilizes them to work toward common goals of improvement, they are more engaged overall.

Reduce Employee Turnover

As just mentioned, it is important to create an environment where employees to concern more about company improvements which make them more engaged overall. Engaged employees in a group attempt to reduce the company's environmental footprint will often have an increased employee focus and retention. For an organization it is always easier and less expensive to keep employees than it is to recruit and train new employees.

The prime reason for adopting and implementing environmental management system through ISO 14001 is to improvise environment by reducing our environmental footprint of a company or organization. It can be easier to justify the cost of making these improvements by focusing on these other benefits that can go away from the simple ideals of environmental stewardship and focus more on the long-term advantages of employing an environmental management system.

3.6 OHSAS 18001: COMPARISON TO ISO 14001 AND ISO 9001

Dear Learners, let us now read about OHSAS 18001: Comparison to ISO 14001 and ISO 9001 in the following sentences:

3.6.1 Introduction to OHSAS 18001

An Occupational Health and Safety Management System (OHSMS) provides a framework for managing Occupational Health and Safety (OH&S) activities, procedures and processes so they become more efficient and a more integrated part of the overall business operations. The Occupational Health and Safety Assessment Series (OHSAS) 18001, developed in 1999 focusing on Occupational Health and Safety Management system. The primary rationale behind OHSAS 18001 is to continuously minimize occupational hazard risk in the workplace, which in turn improve the company profitability. Additionally, OHSAS 18002 provides guidance for establishing, implementing or improving a management system which is based on OHSAS 18001 and demonstrating successful implementation of OHSAS 18001. It is a documentation intensive system that can be altered and customized to outfit organizations particular needs. The OHSAS 18001 was developed to be compatible with the ISO 9001 (Quality) and ISO 14001 (Environment) management systems standards. Hence it is easier to integrate quality, environment and occupational health and safety management systems standards by organizations.

3.6.2 Challenges of OHSAS 18001

- Originally published as a specification it was not a formal standard, an official British Standard, nor was it an official International Standard.

- It does not state specific Occupational Health and Safety(OH&S) performance criteria and do not provide a detailed specifications for design of a management system
- No accreditation scheme based on OHSAS 18001
- Certification bodies can only issue non-accredited certificates for OHSAS 18001 (e.g. Certificate of Conformance)
- Cost of Conformance Certificates.

3.6.3 Benefits of OHSAS 18001

- It provides a flexible management system framework
- Completely Voluntary in nature
- It allows organization to select from multiple recognition bodies
- It does not require specific performance threshold (i.e. TCIR and DART rates below peers)
- It can have regulatory violations but still receive recognition.
- It is aligned with ISO 9001 and ISO 14001
- It integrates existing Standards with Health and Safety easier.
- It is internationally recognized.

3.6.4 Integrated Management System

Historically many organizations started by implementing quality management system ISO 9001. Later, looking into the environmental impact of the organization they began to incorporate environment management requirements from ISO 14001. Many organizations now look at implementing all three standards to enhance their image in society and also to prove their concern for environment and their employees. Implementation and operation of three different management systems within an organization is a time-consuming, expensive and inefficient process. According to the integrated management systems (IMS), the organization can minimize duplication documents and work load, align objectives and reduce costs. An IMS describes several previously separate management systems grouped together to form a single system. A management system is integrated when at least two out of three possible systems are integrated as shown in Fig. 3.

The different possibilities are:

- Quality + Environment,
- Quality + Health & Safety,
- Environment + Health & Safety
- Quality + Health & Safety + Environment

OHSAS 18001 & ISO 14000 are quite similar to an extent but differ from ISO 9001, structure wise because ISO 14000 and 18000 contains four clauses with six elements whereas, ISO 9001 contains five clauses with 23 elements. Even with common system approach, they vary in their content.

Apart from structure, ISO 14000 comprises of following unique requirements:

1. Environmental aspects and impacts
2. Legal and other requirements
3. Environmental programs
4. Communication
5. Emergency preparedness and response

There are seven common elements in OHSAS 18001, ISO 9001 and ISO 14001

1. Structure and responsibility
2. Training, awareness and competence
3. Document control
4. Records
5. Corrective and preventive action
6. Internal audits
7. Management review

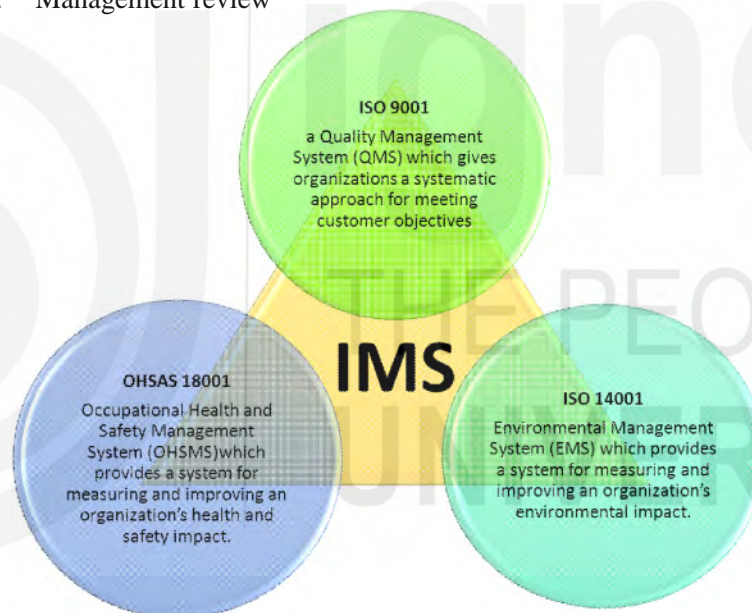


Fig. 3.2: Integrated management system concept

The main objective of IMS is to streamline processes even further and avoid duplication procedures and working process. However, just because a system is integrated does not mean less attention is paid to auditing individual systems. The system must conform to the requirements of the individual standards, in order to maintain a high level of credibility and effectiveness.

Advantages of Integrated Management Systems

- Consistent objectives, planning, and document management
- Implementation and Operation of the system cost less.

- Easier internal audits
- No Redundancies, reducing the chance of conflict.

Disadvantages

- Responsibility of QMS and EHS can be conflicted in some organizational structures
- Documentation can be more intricate.
- External third party audits can be more difficult.

Check Your Progress 1

Note: a) Write your answer in about 50 words.
b) Check your progress with possible answers given at the end of the unit.

1. What is ISO? Briefly describe its evolution.

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2. What is ISO/TC 207 and explain its involvement in shaping up Environmental Management System.

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3. Describe the fundamental of ISO management system standards.

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4. Discuss theKey Benefits of ISO 14001.

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5. Explain ISO family standards with respect of Environmental Management Standards (EMS).

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6. Write a detailed note on integrated management system.

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.....

7. Describe OHSAS 18001 and discuss its possible implementation with ISO 14001 and ISO 9001.

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3.7 LET US SUM UP

In 1947, International Organization for Standardization (ISO), founded in Geneva, Switzerland that has been revised and updated with several norms and standards in field of intellectual, scientific, technological and economic activity since past 70 years. The basis of ISO 14001 built on concept of **Plan: Do: Check: Act cycle** that assures development, improvement and control of management system. ISO 14001 comes with benefits regarding cost, consumption of energy, dignity of corporate sectors and much more. According to ISO 14001, EMS act as a management tool to control the impact of activities, products and services lead by any organization and industry. ISO 14001 is well known and widely accepted and practiced standard among all models of EMS. The integration of OHSAS 18001 with ISO 9001 and ISO 14001 to manage system standards. OHSAS 18001 concerned with reducing occupational hazard at workplace. An IMS comes with approach to reduce the risk regarding quality, environment, health and safety issues.

3.8 KEY WORDS

International Organization for Standardization, Environmental Management System, Plan-Do-Check-Act, Occupational Health and Safety Assessment Series, Integrated Management System.

3.9 REFERENCES AND SUGGESTED FURTHER READINGS

1. An introduction to ISO 14000 – Environmental Management System, Bulletin No. 78/2007.
2. Cascio, J. (1996). The ISO 14000 Handbook, Port City Press, Baltimore.
3. Christini, G., Fetsko, M. and Hendrickson, C. 2004.Environmental Management Systems and ISO 14001 certification for construction firms. Journal of Construction Engineering and Management, Vol. 130: 3.
4. Intarajinda, R.,Sriamonkitkul, W. andChutiprapat, V., Bhasaputra, P. and Pattaraprakorn, W. 2011.The successive implement of ISO 9001, ISO 14001

5. Kinsella, J. and McCully, A. D. 2006. Handbook for Implementing an ISO 14001 Environmental Management System. Elsevier Limited.
6. Matthews, D. H. (2001). "Assessment and design of industrial environmental management systems". Doctoral Dissertation, Carnegie Mellon Univ., Pittsburgh.
7. www.iso.org (Report : Introduction to ISO 14001:2015)
8. www.advisera.com
9. www.nsai.ie

3.10 ANSWERS TO CHECK YOUR PROGRESS

Answers to Check Your Progress 1

Your Answers should include the following Points:

1. Your answer should contain a brief note on genesis, structure and function of ISO and its evolution. You will find the answer in section 3.1 and 3.2.
2. Your answer should contain a brief note on ISO/TC207 and its involvement in EMS. You will find the answer in section 3.2
3. Your answer should contain explanation to ISO management system standards and also explain Plan : Do : Check : Act" (PDCA) cycle. You will find the answer in section 3.2.1 and 3.2.2.
4. You will find the answer in section 3.5
6. Your answer should include some important ISO standards as shown in Table 2 with brief explanation.
7. You will find the answer in section 3.6.4 with figure.
8. Your answer should include introduction, challenges and benefits of OHSAS and discuss its possible implementation with ISO 14001 and ISO 9001.

UNIT 4 ENVIRONMENTAL LABELING

Structure

- 4.0 Introduction
- 4.1 Objectives
- 4.2 What is Environmental-Labeling?
- 4.3 Concept of Eco-Labeling
- 4.4 Objectives of Eco-Labeling
 - 4.4.1 Environmental Protection
 - 4.4.2 Inventing and Promoting Environmental Friendly Technologies
 - 4.4.3 Sensitizing the Consumer About Environment Related Issues
- 4.5 Classification of Eco-label
- 4.6 Origins of Eco-labeling
- 4.7 Guiding Principles for Eco-labeling
- 4.8 Green Claims
 - 4.8.1 Basic Requirements for Green Claims
- 4.9 Ecomark
 - 4.9.1 Criteria for Ecomark Scheme
 - 4.9.2 Mechanism of the Scheme
- 4.10 Let Us Sum Up
- 4.11 Key Words
- 4.12 References and Suggested Further Readings
- 4.13 Answers to Check Your Progress

4.0 INTRODUCTION

The population on Earth is increasing day by day especially in developing countries. This puts a tremendous pressure on every component of the environment. Industrial development is necessary for any country for livelihood and other requirements, but it creates a lot of environmental issues. The different environmental issues like climate change, global warming, ozone layer depletion, acid rain, loss of biodiversity, deforestation, depletion of natural resources are examples of some of the burning issues, which received international attention about 40 years back in the Stockholm conference, held on 5th June, 1972.

The quality of every component of environment is equally important for healthy life. Hence, one of the important issues is production of goods by using eco-friendly technique, which will create less environmental issues. By adopting this strategy we can save resources not only for future generation but can also achieve sustainable development. In the same context governments, nongovernmental organization and financial enterprises throughout the world initiated the program of eco-labeling to make the customer aware about

environment concern. The environmental-labeling is voluntary program of certification of a product in context to its environmental impacts from origin to end as waste. These environmental labels can play an important role in the conservation of natural resources and in sensitization of public about importance of natural resources.

This unit highlights the different issues related to issuing of eco-labels to a product, its necessity, objectives, principles and origin etc. Moreover, you will be learn more about Green claims and Ecomark scheme.

4.1 OBJECTIVES

After going through this unit you will be familiar with various topics related to eco-labeling :

- eco-labeling and their objectives
- classification of Eco-labels
- origin of the Eco-labeling
- guiding Principles for Eco-labeling
- ecomark Scheme of India
- objectives of Ecomark Scheme
- criteria for Ecomark Scheme

4.2 WHAT IS ENVIRONMENTAL-LABELING?

The environmental-labels are a group of labels based upon the environmental performance of product i.e. positive, negative or neutral impacts of a product on the environment. Eco-labels are subgroup and they respond to special criteria. The environmental preferences of a product or service within a specific product/service category can be identified by an eco-label. It is a tag, which represents the possible environmental impacts of a product/service during the course of manufacturing and use. The environmental labels are generally voluntary but may be mandatory in some cases. According to Environmental Protection Agency, the three most important components of environmental labelling are:

- Unbiased third party involvement is necessary during certification of a product
- There should be voluntary/mandatory participation by financial enterprises/ firms and
- The labelling can be positive or negative. If any product has positive environmental impact then it will be promoted and if any product has negative environmental impacts then warning will be issued.

International Standards Organization (ISO) is an autonomous body, which looks at the different goals to be achieved for effective implementation of these labels. List of some of the standards developed by International Standards Organization (ISO) is listed below in table 1.

Table 1: Some of the Standards Developed by International Standards Organization (ISO)

Sr. No.	Nomenclature of Standard	Used for following
1.	ISO 14020	<ul style="list-style-type: none"> Deals with labelling standards Product marks Meanings of marks
2.	ISO 14021	<ul style="list-style-type: none"> Used for providing guidelines for environmental/green claims
3.	ISO 14022	<ul style="list-style-type: none"> Deals with standardization of environmental labels
4.	ISO 14040 & ISO 14044	<ul style="list-style-type: none"> Deals with the guidelines for life cycle consideration
5.	ISO 14000 family	<ul style="list-style-type: none"> Environmental management in industries

Source: Porrini, D. (2005). Environmental policies choice as an issue of informational efficiency. *The Elgar companion to law and economics*, 350

Several steps are involved in implementation of different environmental labels. The different steps which have to be considered by certification agency are listed in table 2.

Table 2: Steps Involved in Labeling and Certification Process

Phases	Steps	Issues to consider
Preparation and Launching Phase	Assignment of responsibilities	Clear assignment of who is responsible for defining criteria, certifying products, and generally administering the program
	Selection and determination of product categories	Selection of product categories and determination of certification criteria for these categories. Gathering of proposals for certification criteria and categories from industry, science, trade, consumers, environmental, and other public organizations (stakeholder process)
Negotiation Phase	Development of criteria, standards, or guidelines	Once product categories are selected, the next step is the establishment of requirements that an applicant must meet to be approved by the eco-labeling program. For example, if a labeling program is developed to overcome trade barriers, then the country's labeling requirements should

		<p>be consistent with labeling requirements in other countries. Criteria for granting an eco-label to a product or service can be limited, or without limits, as to the number of products that will qualify for the label. The group responsible for setting the criteria may include scientific and technical experts from both government and the private sector. Feedback and comments from interested stakeholders should be included before finalizing the list of criteria. This list should be periodically reassessed.</p>
Implementation Phase	Certification and licensing	<p>Producers, service providers, suppliers, retailers, distributors, importers, and legitimated institutions may apply for certification. The awarding process includes testing and compliance verification, applicant licensing, and monitoring (with periodic reexamination every 2 to 5 years). Applicants usually have to pay an application fee, the cost of verification, and an annual fee for use of the eco-label; these fees depend on annual product turnover.</p>

Source: Porrini, D. (2005). Environmental policies choice as an issue of informational efficiency. *The Elgar companion to law and economics*, 350

The different environmental labels by themselves may not modify customer attitude towards these products. However, it is observed that promotion by integrated campaigns through education and incentives are found to be effective in changing consumer attitude. More conscious clients tend to take into account environmental labels along with environmental safety and brand value while making purchasing decisions. Thus awareness among customer about environmental labels is most important component. Issues by themselves may not cause a consumer to use a particular product unless he or she realizes how buying choices will affect the relevant environmental issue. This is possible only if product characteristics are clearly presented to the consumers. In addition, these labels should indicate to consumers what they have read on the label.

There is always the challenge of the consumers getting confused because of ambiguity in the presented information. It is therefore essential to standardize existing labeling procedures. The International Standardization Organization (ISO) labeling standards try to achieve these goals. ISO 14020 focuses on labeling standards and deals with product marks and their meanings. Labeling standards are likely to affect sales and advertising functions.

4.3 CONCEPT OF ECO-LABELING

Eco-labeling is a technique of certification of a product/process for environmental concern throughout the world voluntarily. Generally, assigning of an ecolabel to any product indicates that the product is more environmentally safe as compared to other products in the same category which is not assigned an ecolabel. Actually, ecolabel is awarded by an independent autonomous body to a manufacturer or service provider for particular product or service on the basis of their environmental impacts with due time assessed independently. Life cycle assessment (LCA) is an important tool, which is used to evaluate the positive and negative environmental impacts of a particular product. It is done by analyzing the various processes throughout the manufacturing of a product e.g. raw material used, energy, manufacturing process and other important factors related to the product. The various activities carried during LCA inform the customer regarding environmental stress reductions through origin to end of a product. Eco-labeling follows a systematic pattern i.e. setting of criteria, testing, monitoring and awarding of a certificate. The scheme of Eco-labeling not only encourages the development of environmentally sound and friendly techniques but also awares the public about environmental concern. Nowadays people prefer products with Eco label because of the rising awareness about environmental issues.

4.4 OBJECTIVES OF ECO-LABELING

It is a well-known fact that earth is the only planet where we can live. But due to activities of humans, the environment on earth is deteriorating day by day and as a result, humans have started to think about earth's environment since last 50 years. Minimum environmental impacts. Eco-labeling is not a very old concept; it emerged after the 1992 Rio conference. The different objectives of Eco-labeling are:

4.4.1 Environmental Protection

One of the most important objectives of eco-labeling is to encourage the consumer to think and prefer an environmentally safe product and service. In this regard, various possible important objectives may be:

- Encouraging the people for efficient use of non-renewable resources so that future generation can also use these resources.
- Encouraging the people to manage renewable resources so that they may remain available for present and future generation.
- Encouraging the people for proper handling and management of chemicals to minimize detrimental impacts.
- Encouraging the people to obey the principle of 3R' i.e. reduce, reuse and recycle the waste materials; and
- Promoting natural resource conservation and preserving biodiversity.

4.4.2 Inventing and Promoting Environmental Friendly Technologies

It is well-established fact that when an eco-label is awarded to any product, it indicates that this product has less environmental impact as compared to similar product without an eco-label.

- It motivates the manufacturer to invent and develop more and more ecofriendly products/services.
- These practices encourage the idea of green business with minimal environmental impacts and create new market for nature lover i.e. growing a market based upon natural resource products produced sustainably.

4.4.3 Sensitizing the Consumer About Environment Related Issues

The various countries of the world have adopted the policy of awarding eco-label to a product with complete information of environmental impacts of that product.

- The concept of eco-labeling may also helpful in creation of awareness among the consumers about the environmental issues.
- People prefer to buy the product with eco-label due to environmental concerns.
- Moreover, it can be used to create awareness among the consumers where people are less bothered about environmental issues. Hence, awarding an eco-label to a product sensitize the customers.

4.5 CLASSIFICATION OF ECO-LABEL

There are different types of eco-label for different kinds of product but International Standards Organization (ISO) has developed three types of environmental labels and specified the preferential principles and procedures for each one of them. All the three types of eco-labels are briefed below in table 3.

Table 4.3: Environmental Labels developed by International Standards Organization (ISO)

S.N.	Number	Type	Details	Parties
1.	ISO 14024	Type I	It is voluntary and third party programme of certification of a product, multiple criteria basis and life cycle assessment of a product; certificate is awarded by third party to a manufacturer by authorizing him to use this environmental label with environmental preferability within a particular product category and known as environmental labeling.	Third party certification

2.	ISO 14021	Type II	These types of claims are voluntary and self declared by a manufacturer, importer or distributor for a product and known as self declaration claims or green claims.	First party certification
3.	ISO 14025	Type III	It is also a voluntary and third party programme of certification of a product. The environmental parameters are assessed by a third party and reported for product. This report is re-verified again by a competent and qualified third party and known as environmental declarations.	Third party certification

4.6 ORIGINS OF ECO-LABELING

Environmental degradation and depletion of natural resources have put a pressure on human to think about ecofriendly technology, energy efficient and alternate sources of energy. Nowadays, people are more concerned about environment protection as earth is the only planet where life exists at present. The issue of environmental concern has brought the government, industry and consumer on a common goal of environmental protection. We are celebrating national and international daysto give regard and to spread awareness for environmental issues. Some of these are celebration of world environment day, water day, earth day and ozone dayetc. The growing concern about environmental protection has led to origin of eco-labeling onthe part of governments, businesses enterprises and the people.

In late 1970s most of the developed nations initiated the process of eco-labeling for certain products. Germany was the first country of the world that initiated and implemented the concept of ecolabeling in 1977 and the ‘Blue Angle’ was the name of first eco-label.After the successful launch of this first eco-label various other countries e.g. USA, Sweden, Spain, Singapore, Norway, New Zealand, Korea, Japan, India, France, Austria, Canada etc. started their eco-labelling programmes. Moreover, at global level eco-labeling scheme is coordinated by Global Network of Countries (GEN) and India is also the member of same. The eco-labeling scheme launched by some of the pioneer countries along with year of starting is shown in table 4.

Table 4.4: Eco-labeling scheme launched by various countries





Country	Name of Programme	Year	Country	Name of Programme	Year
Germany	Blue Angel	1977	India	Ecomark	1991
Canada	Environmental Choice	1988	European Union	European Flower	1992
Japan	Ecomark	1989	France	NF-Environment	1992

Nordic Countries	White Swan	1989	South Korea	Ecomark	1992
New Zealand	Environmental Choice	1990	Singapore	Green Label	1992
Sweden	Good Environmental Choice	1990	The Netherlands	Stichting Milieukeur	1992
U.S.	Green Seal	1990	Croatia	Environmentally Friendly	1993
Austria	Austrian Eco-label	1991			







Source: Singh, A.P., Raman, N.S. and Waghe, U.P., 2012. Ecomark Scheme in India. *International Journal of Pharma Medicine and Biological Sciences*, 1(2).

At present there are approximately 25 countries on the list of Global Network of Countries (GEN). The first eco-label of India was launched on June 2011 named as 'The Green Signal'. The list of different eco-labels along with their logo's available in India is presented in table 5.

Table 4.5: List of available Eco Labels in India

S.No.	Eco Label	Symbol	Description
1	Energy Efficiency Labeling		Bureau of energy efficiency award star labels for energy efficiency of different appliances. It may be voluntary as well as mandatory.
2	Certification body for Sustainable Development		Certify organically grown agricultural products and to promote organic logo internationally as well as national level.
3	Forest Stewardship Council (FSC) Chain of Custody Certification		Promote forest management worldwide, voluntarily certify products derived from well-managed forests and allow manufacturer to promote their products.
4	Good Weave International		Formerly known as RugMark, work for abolition of child labor and protecting rights of adult worker of handmade rug industry, providing education to children of South Asia

Environmental Standards

5	Green Globe Certification		Promote sustainable tourism, aware the people of tourist industry for saving water, energy, to improve the environment
6	Organic Certification		Certify organically produce agricultural products as per international standards, promote export of such products
7	UPS Carbon Neutral		Promote in the reduction green house gases (GHG) by carbon neutral shipping programme in India through purchasing carbon credits.
8	The Green Signal		Developed by IIM, Ahmedabad for certification of environmental preferences of a product/service.
9	Ecotel Certification		Certificate is awarded to environmentally aware and sensitive hotels industry.
10	Fair Trade		Work for empowering the marginal land holding farmers and farm workers of the poor nations of Asia.
11	Better Cotton Initiative		Reducing environmental impacts through organic cotton production and improving social & economic conditions of cotton growing farmers throughout the world.
12	Global Organic Textile Standards (GOTS)		Standardization & certification of organic fiber production, promotion of natural fibers and promotion and certification of eco textile processing techniques.

The business enterprises have observed that public is demanding environment friendly products due to environmental concerns. This gave an idea for eco-labeling and origin of new market of different product/services with a number of environmental declaration and claims, for example, '100% natural', 'biodegradable', 'eco-friendly', 'energy efficient', 'low energy' etc. The products/services with such labels engrossed the customers who want to lessen the environmental impacts through their buying habits for a particular product. Sometimes, these labels may threaten the consumers. Without guiding standards and analysis by an autonomous third party, consumers may not be convinced that the companies' assertions assured that each labeled product was an environmentally preferable substitute.

4.7 GUIDING PRINCIPLES FOR ECO-LABELING

The combined efforts of government, industry and non-governmental organizations are equally important for the development of an ecolabel to achieve a specific set of objectives. There are some guiding principles prescribed by International Standards Organization (ISO) on basis of their personnel experiences. These guiding principles are discussed in brief below:

1. **Voluntary participation:** There must be voluntary participation in to an eco-labeling program by manufacturers, importers, service providers and other financial enterprises. It means there should not be mandatory condition of participation for financial enterprises.
2. **Compliance to environmental and other relevant legislation:** The environmental aspects and other legislative requirement must be taken in to consideration while implementing an eco-labeling program for a product/service. Moreover, before issuing of a license for this programme, compliance of environmental aspect is must.
3. **Consideration of 'fitness for purpose' and level of overall performance:** Along with legislative compliance, quality and performance of a product is to be addressed before awarding an ecolabel to a product.
4. **Based on sound scientific and engineering principles:** Before awarding an ecolabel to a product its life cycle assessment must be done scientifically and fairly which assures the consumers that they can trust the eco-label. It means ecolabel must be assigned after life cycle review of the product honestly.
5. **Criteria must distinguish leadership:** The type of criteria, which is developed and adopted, should be exclusive and represent leadership segment of a product category from the rest of the category.
6. **Criteria must be credible, relevant, attainable, and measurable/verifiable:** It means safeguarding the strict procedural necessities based upon good ecological science which assures the customers that they can belief the eco-label and licensing applicants that they will be treated fairly.
7. **Independence:** The organization authorized for ecolabelling should be autonomous and must have no vested commercial or other interests while promoting a product.

8. **Open and accountable process:**The program can be checked, monitored and questioned at any time of evaluation of a product i.e. it must be open and accountable process. Moreover, at each step fair, reliable and equally applied procedures must be established
9. **Flexibility:** In order to be reliable and efficient, programs must run in a professional and cost-effective way steady with market forces and necessities.
10. **Consistency with ISO 14020 and ISO 14024 guiding principles.** Guiding Principles for Environmental Labeling according to ISO 14020:
 - i) Precision and accuracy
 - ii) Avoiding needless trade barriers
 - iii) Scientific element basis
 - iv) Provision of information on methodology
 - v) Life-cycle consideration approach
 - vi) Minimal administrative burden; open, consensual process provision of information on products.

4.8 GREEN CLAIMS

The green claims are voluntary and self declared by a manufacturer, importer or distributor for environmental quality of a product and known as self-declaration claims or environmental claims or green claims. The information related to environmental effects and qualities of products and how to use and dispose etc. are claimed by green claims. These claims help's consumer in decision making while buying a product. They also help to increase consciousness of the environmental issues, enhance consumer understanding and improve product standards overall.

Actually these statements are not verified by any third party/external source and not approved by government body. The product label and packaging, advertisement material, promotional events etc. are used to present environmental or green claims of a product/service. The various ways can be used to show claims e.g. words, slogans, symbols, graphics, logos, brand names etc. and print, electronic and digital media can be used to popularize the product. International Standards Organization (ISO) and other autonomous bodies have developed international standard for environmental claims i.e. ISO 14021. The examples of some of the green claims is mentioned below: recycled content, energy efficient, zero carbon footprint, water efficient, renewable materials, biodegradable, compostable, recyclable, reduced energy consumption, reduced resource use, reduced water consumption, reusable & refillable, non toxic and ozone friendly etc.

In a nut-shell, these green claims should be actual, truthful, accurate and verifiable by any autonomous organization. Moreover, the customer should not be misled by false environmental information of a product. It is pertinent to mention here that sometimes, financial enterprises/firms do not work honestly. They declare false information in the name of good environmental management and falsely claim the green claims this is known as '*greenwashing*'.

The greenwashing is an unethical practice and misinform the consumers about the environmental preferences of a product. It not only affect the market share of green label products but also change the mindset of customer who is otherwise sensitive about green products. The right claim must be scientifically proven and information about the same should be available easily to those who want to enquire. Hence, if anyone wants to investigate about the accuracy of any claim, it would be tedious and time-consuming task.

The products with diverse type of sloganse.g. ‘eco-friendly’, ‘green’, ‘environment friendly’, ‘non polluting’, ‘go-green’, ‘sustainable’ etc and pictures of earth, globe, tree etc. have no meaning in true sense about environmental protection however, they may mislead the customer and society with false information i.e. claim should clearly indicate about the environmental component/issue covered. Therefore, an authentic green claim should follow the guidelines laid down by International Standards Organization e.g. ISO 14021.

The Basic Requirements for Green Claims

- Should not be misleading
- Should be accurate and verifiable
- Unlikely to result in misinterpretation

4.9 ECOMARK

Increasing concern about environmental issues has give rise to the concept of green marketing throughout the world. Now, literate and sentient customers demand environmentally compatible products. If manufacturers have to sell their products in the market then they have to develop it in eco-friendly way i.e. promoting the concept of green marketing. Moreover, manufacturers wishing to protect their present market and expand in to new ones may require green labels. To increase consumer awareness, the Government of India launched the eco-labeling scheme known as ‘Ecomark’ scheme. In this context government of India in co-operation with some autonomous organizations adopted ‘Ecomark’ scheme, and earthen pot i.e. ‘matka’ was selected as the symbol for the same.



Fig. 4.1 Indian Ecomark logo

The ‘Ecomark’ scheme was notified by Ministry of Environment and Forest, GOI in 1991 regarding certification of environment friendly products. The scheme is employed to whole of India, voluntary in nature and any citizen/ firm can apply for the labeling of their product/service. The ecomark labels is issued to the products/service which are environmental friendly and meet the quality requirements of Indian Standards and follow the approach of cradle to grave

i.e. extraction and refining of raw material, manufacturing and at last disposal of product. The product categories covered under Indian Ecomark Scheme is given in table 2.

Table 4.6: Product categories covered under Indian Ecomark Scheme

Sr. No.	Category	Sr. No.	Category
1	Batteries	2	Lubricating Oils
3	Coffee	4	Packaging Materials
5	Cosmetics	6	Paints and Powder Coatings
7	Electrical/Electronic Goods	8	Paper
9	Fire-extinguisher	10	Plastic Products
11	Food Additives	12	Soaps & Detergents
13	Food Items	14	Textiles
15	Leather	16	Wood Substitutes
17	Aerosol Propellants		

Source: <http://cercervis.nic.in/> cited on 21.04.2018.

4.9.1 Criteria for Ecomark Scheme

Basically it is based upon cradle to grave principal i.e. extraction and refining of raw material, manufacturing of a product and at last disposal of product safely. The various factors identified while choosing a product for ecomark are:

- Causing less environmental pollution as compare to other similar product.
- Made up of renewable natural resources as compare to other similar product.
- Can be recycled as compare to the other similar product which is not recyclable.
- Easily biodegradable as compare to other similar product which is not biodegradable.
- Consume less non renewable natural resources as compare to the other similar product.

4.9.2 Mechanism of the SCHEME

According to rule three committees are involved in criteria development for each product category and the award of Ecomark. The three different committees are as-

1. Steering Committee set up in the Ministry of Environment & Forest (MoEF)

This most important function of the committee is to decide the product categories for awarding Ecomark along with other important issues e.g. promotion, improvement and development of the scheme.

2. Technical Committee in the Central Pollution Control Board (CPCB).

The various functions of this committee include are- classifying environment friendly products, reviewing the existing criteria, product assessment and evaluation of environmental impact of a product.

3. Sectional Committee of the BIS and/or Directorate of Marketing.

The different functions of this committee include are- certification and award of Ecomark, to review the license, inspection and analysis of a sample/product etc. Initially label is issued for one year but latter on it may be continued on the basis of performance. The Bureau of Indian standards have power to withdraw the license at any time if firm found guilty or giving false information regarding the product. The scheme was developed for a good cause but does not gain desired popularity. Perhaps, it may be due to illiteracy, attitude and lack of knowledge about the importance of environment.

Check Your Progress 1

- Note:** a) Write your answer in about 50 words.
b) Check your progress with possible answers given at the end of the unit.

1. What do you mean by eco-labeling? Discuss in brief about different types of eco-labels.

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2. Discuss in detail about steps involved in the process of awarding eco-labels.

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3. Write in brief about origin and objectives of the concept of eco-labels.

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4. Write a brief note on eco-labeling scheme launched by various countries.

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5. Write about eco-labels available in India with suitable diagrams and their detail.

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6. What are the guiding principles for eco-labeling? explain in detail.

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7. What are green claim? Describe the concept of green claim in brief.

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8. What is an eco-mark? Discuss about Indian eco-mark scheme.

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9. Explain in brief about criteria adopted for awarding an eco-mark.

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4.10 LET US SUM UP

In this unit, you have studied about product developed by taking in to consideration environmental issues. It is now well established that all the products developed through extraction to refining have some environmental impacts through manufacturing, uses and disposal throughout their life. Eco-labeling follow a systematic pattern i.e. setting of criteria, testing, monitoring and awarding of a certificate. The scheme of Eco-labeling not only encourage the development of environmentally sound and friendly techniques but also aware the public about environmental concern. In today’s world, people prefer the product with eco-label because of awareness about environmental issues. There are different agencies at international and national level which issue certificates to manufacturers for their environmental commitment in the form of eco-labels, eco-mark etc. The green claims are voluntary and self declared by a manufacturer, importer or distributor for environmental quality of a product and known as self declaration claims or environmental claims or green claims. The information related to environmental effects and qualities of products and how to use and dispose etc. are claimed by green claims. These environmental labels can play an important role in the conservation of natural resources and in

sensitization of public about importance of natural resources. Beside these agencies product developer can also claim green or environmental claims at their own, but these claims should be accurate and authentic.

4.11 KEY WORDS

- Ecomark** : To increase consumer awareness, the Government of India launched the eco-labeling scheme known as 'Ecomark' scheme.
- Environmental-labels** : The environmental-labels are a group of labels based upon the environmental performance of product i.e. positive, negative or neutral impacts of a product on the environment.

4.12 REFERENCES AND SUGGESTED FURTHER READINGS

Devinder Pal Singh (2011). Consumers Attitude for Eco-labels in an Emerging Economy, *Int. J. of Business Policy and Economics*, Vol. 4 (1): pp 1-8.

Shekhar D Bhole¹, U P Waghe and N S Raman (2013). Eco-marks Indicators in India. *Int. J. Life Sc. Bt & Pharm. Res.* Vol 2(4): pp 28-41.

<http://cercervis.nic.in/>, www.cercindia.org.

A P Singh¹, N S Raman¹ and U P Waghe (2012). Eco-mark Scheme in India. *Int. J. Pharm. Med. & Bio. Sc.* Vol. 1(2): pp 109-122.

A guide to environmental labels for procurement practitioners of the United Nations system (2009). UNOPS 2009 available at www.ungm.org.

Environmental labels and declarations How ISO standards help, available at www.iso.org.

Michanne Haynes. Eco-labelling: Challenges and Opportunities for Small States and LDCs, *Commonwealth trade hot topics issue* 95.

Simi T B (2009). Eco-labels: Trade Barriers or Trade Facilitators, CUTS Centre for International Trade, Economics & Environment, India available at : www.cuts-citee.org.

Environmental Labeling Issues, Policies, and Practices Worldwide, EPA 1998.

Green Claims – Practical Guidance How To Make A Good Environmental Claim, available at : www.defra.gov.uk.

Introduction to Global Ecolabelling Network (GEN) Information Paper, <http://www.gen.gr.jp>.

Environmental Labelling: An overview by Sustainable Business Associates Switzerland www.sba-int.ch.

CERC-ENVIS Centre www.cercervis.nic.in, www.cercindia.org,

4.13 ANSWERS TO CHECK YOUR PROGRESS

Answers to Check Your Progress 1

Your answers should include the following points:

1. Eco-Labeling: It is a tag, which represents the possible environmental impacts of a product/service during the course of manufacturing and use.
2. Step involved in process of awarding eco labels. : Refer to Table 2
3. Objectives of Eco Labeling: (Elaborate on these points)

Environmental protection: One of the most important objectives of eco-labeling is to encourage the consumer to think and prefer an environmentally safe product and service. In this regard, various possible important objective may be:

Inventing and promoting environmental friendly technologies: It is well-established fact that when an eco-label is awarded to any product, it indicates that this product has less environmental impact as compared to similar product without an eco-label.

Sensitizing the consumer about environment related issues.

4. Refer Table4
5. Refer Table 5
6. Guiding principles for eco-labeling: Refer to 4.7
7. **Green claim:** The green claims are voluntary and self declared by a manufacturer, importer or distributor for environmental quality of a product and known as self declaration claims or environmental claims or green claims. The information related to environmental effects and qualities of products and how to use and dispose etc. are claimed by green claims
8. **Eco-mark:** To increase consumer awareness, the Government of India launched the eco-labeling scheme known as 'Ecomark' scheme. The ecomark labels are issued to the products/service which are environmental friendly and meets the quality requirements of Indian Standards and follow the approach of cradle to grave i.e. extraction and refining of raw material, manufacturing and at last disposal of product.
9. **Criteria adopted for awarding an eco-mark:**
 - Causing less environmental pollution as compare to other similar product.
 - Made up of renewable natural resources as compare to other similar product.
 - Can be recycled as compare to the other similar product which is not recyclable.
 - Easily biodegradable as compare to other similar product which is not biodegradable.
 - Consume less non renewable natural resources as compare to the other similar product