Workplace Environmental Management

WEEK 7 – Environmental Impact

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Objectives

At the end of this topic students will be able to:

- Understand Environmental Aspects
- Understand Environmental Impacts
- Understand the impact assessment of the environment

7.1 Environmental Aspects

- Environmental aspects are changes or interactions caused by human activities that affect the environment.

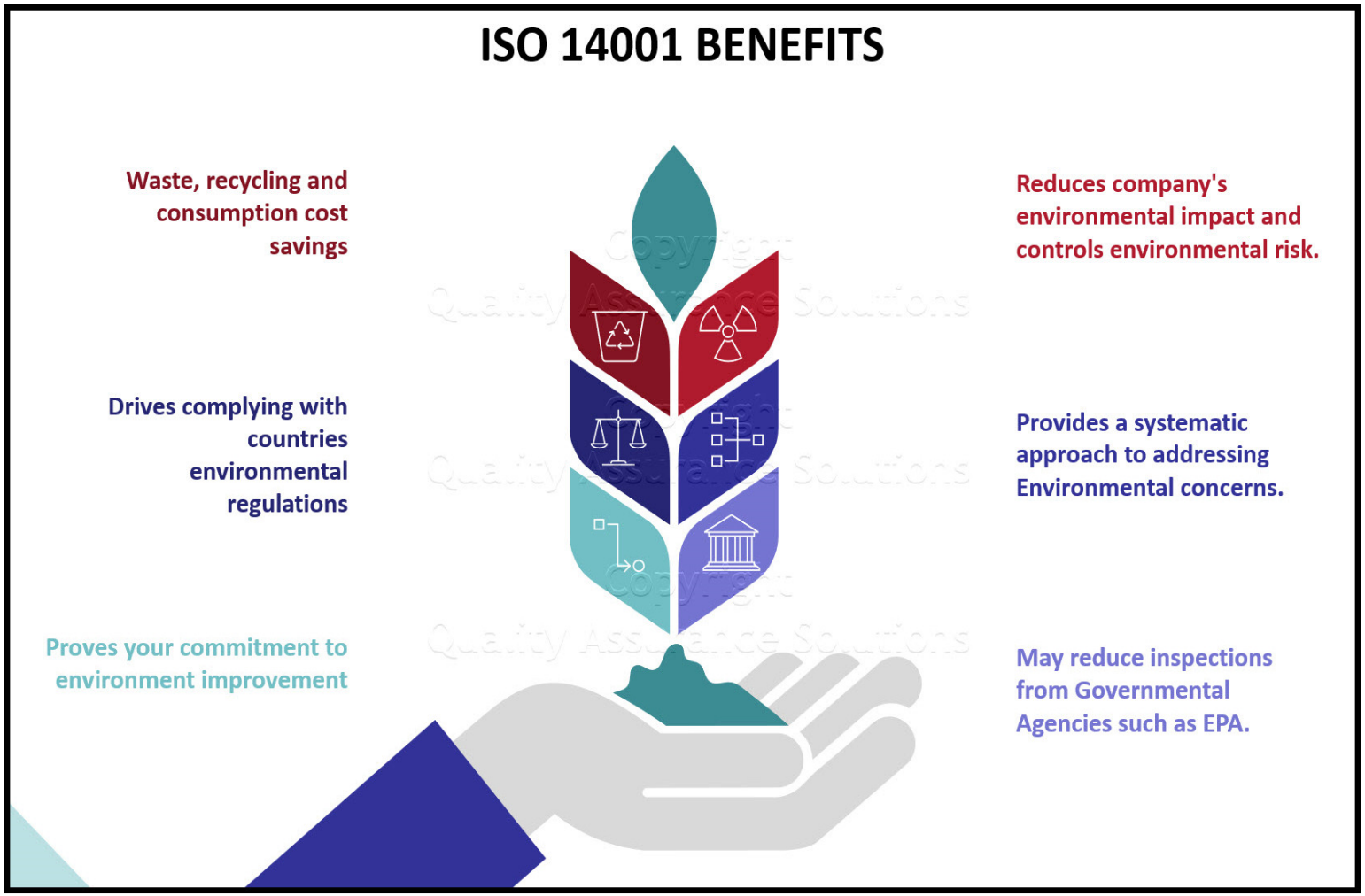
- Environmental aspects refer to specific elements or features of a project, activity, or process that interact with the environment. These aspects can be positive (beneficial) or negative (adverse).

- Aspects are building blocks of EMS, and it follows the PDCA cycle.

- The PDCA cycle is a continuous loop of planning, doing, checking/studying, and acting for a continuous development of an organization.

7.1 Environmental Aspects cont'd

- The key concept of Environmental aspects and impacts is built with the requirements of ISO14001 where managers establish policies for their organization's operation in compliance with the environment safety.
- Thus, this is the reference standardization of organization's operation to comply with the EMS
- Those standards are to establish, maintain and continually improve an EMS.
- **S**ay what you **D**o and **D**o what you **S**ay.
- Importance: Identifying and managing environmental aspects is crucial for sustainable development and minimizing negative impacts.



(https://www.quality-assurance-solutions.com/Benefits-of-ISO-14001.html)

(https://www.3foldtraining.com/iso-14001-2015-environmental-management-principles/)

7.1.1 Air emission; example of aspect

- New project or existing project always have some aspects which will be discussed in summary.

Air emissions from factories:

- Air pollution caused due to the introduction of dust particles, gases, and smoke into the atmosphere exceeds the air quality levels. (https://www.intechopen.com/chapters/72766).
- Good air quality contributes greatly to the quality of life and is essential for humans and the ecosystems. In Rwanda, air pollutants are emitted in a wide range of economic sectors such as transport, energy, industry, and from natural sources such as volcanic eruptions, dust storms, and wildfires. (https://www.rema.gov.rw/our-work/link/air)

7.1.2 Water discharge; example of aspect

Water discharges into rivers:

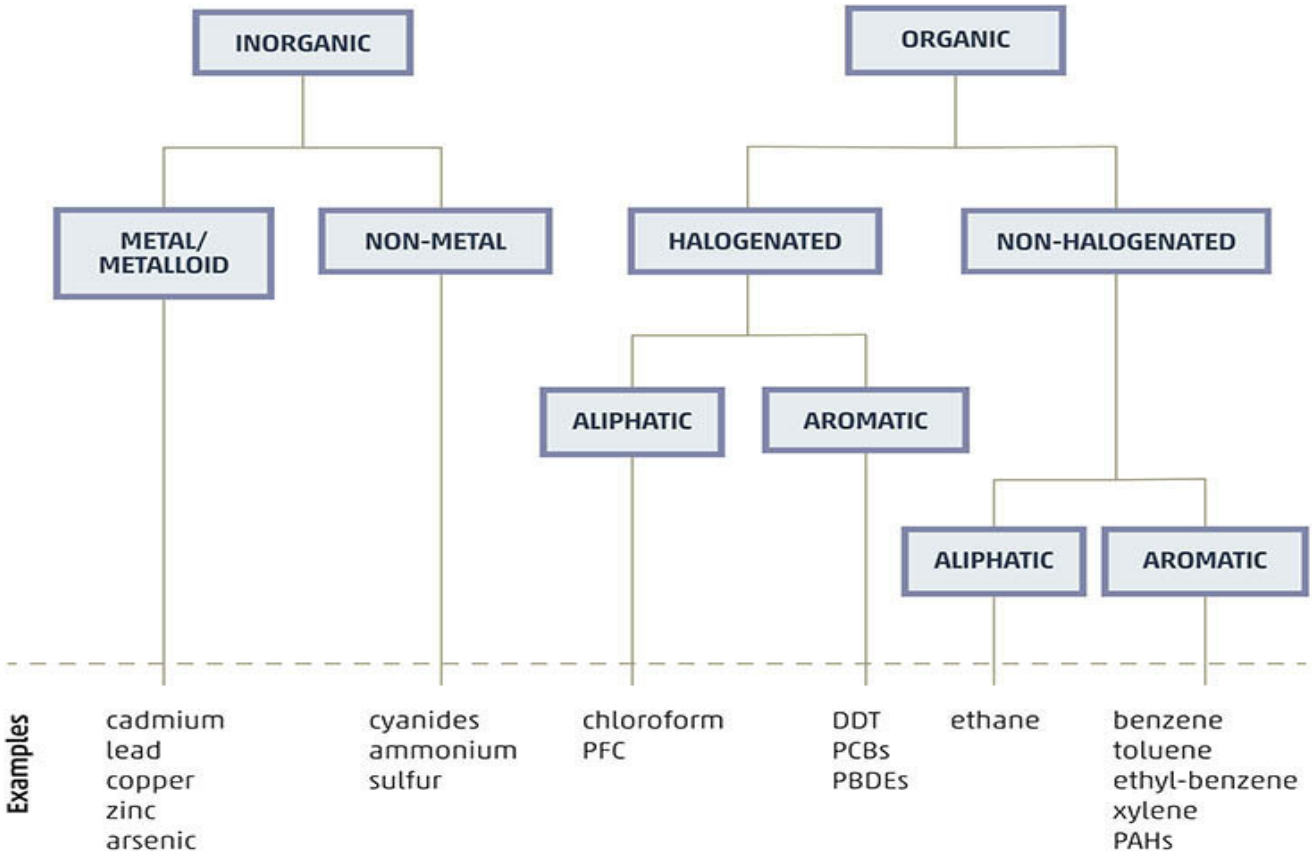
- Water bodies can be polluted by a wide variety of substances, including pathogenic microorganisms, decayable organic waste, fertilizers & plant nutrients, toxic chemicals, sediments, heat, petroleum (oil), and radioactive substances. (https://www.britannica.com/science/water-pollution).
- Many sources are available as this will be discussed using the pictures on the following slide extracted from Encyclopædia Britannica.

This source contains all the information related to the images. (https://www.britannica.com/science/water-pollution).

7.1.3 Soil contamination; example of aspect

Soil contamination due to chemical spills:

- Chemicals that act as environmental contaminants in soil and which potentially cause hazards, are either inorganic or organic compounds. See the figure on the next page to explore much and go deep through the reference provided.
- Hazardous pesticide contamination in soils often results from improper storage of (obsolete) agrochemicals, because of which pesticides are spilled in the surroundings of the storage site, where they seep into the soil or are dispersed by wind. (https://www.undrr.org/understanding-disaster-risk/terminology/hips/ch0010).



The systematic categorization of some of the most common contaminants in soils according to their chemical properties. (https://openknowledge.fao.org/server/api/core/bitstreams/fe5df8d6-6b19-4def-bdc6-62886d824574/content/src/html/chapter-02-2.html)

7.1.4 Habitat disruption; example of aspect

Habitat disruption during construction:

- Construction works contributes in natural habitats to leave construction sites. This causes fragmentation, destruction as well as migration.
- In Rwanda, the rapid development involved many constructions activities led in the loss of many habitat species including animals and plants. (Own words)
- It has influenced the exit of some flora and fauna habitats which are counted to be many.
- Mostly developing countries perform many construction activities which provide the resource consumption and waste that push in habitat loss since plants are removed and animals which are around could not stay because of new human influence.

7.1.4 Habitat disruption; example of aspect cont’d

- According to Cleverton Da Silva et al, in Brazil; roadkill represents much loss of biodiversity with an estimate of 475 million wild animals killed per year.
- It has two aspects: first, the road cuts through the habitat of a given taxon and they interfere with the movement of individuals during daily movements and migration period; and the second aspect results from the abundance of food along the highways serving as an attraction for the fauna. (Seasonal Effects on Roadkill of Wild Vertebrates in a Stretch of a Brazilian Northeast Federal High way, Cleverton Da Silva et al, Research gate, 2022.)

7.2 Environmental Impacts

- While; Environmental Aspect is the element of an organization's activities or products or services that can interact with the environment, Central feature of an organization's EMS.
- Then; Environmental Impact is any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's Environmental Aspects.
- Aspects-inputs-causes and Impact-outputs-effects.
- As an example, discharge of wastewater into a stream results in water pollution. (Environmental Aspects & Impacts, A system for identifying priorities and setting goals, David Ayers, Professional Safety 27, 2010.)

7.2.1 Categories of Environmental Impacts

- The categories of environmental impacts are closely related to the Categories of environmental aspects:

- The categories of impacts are: Global warming, Ozone depletion, Acidification of soil and water, Eutrophication, Photochemical smog, Depletion of abiotic resources-elements, Depletion of abiotic resources-fossil fuels, Human toxicity, Fresh water aquatic ecotoxicity, Marine aquatic ecotoxicity, Terrestrial ecotoxicity, Water pollution, Air pollution.

- The summary of those categories is presented in the following three slides, and all are taken from the following source. (https://ecochain.com/blog/impact-categories-lca/).

Global Warming:

- Refers to long-term increase in Earth's surface average temperature due to the accumulation of greenhouse gases (GHGs) in the atmosphere.
- Such gases are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) because of Human activities, like burning fossil fuels (coal, oil, and natural gas), deforestation, and industrial processes.

Ozone Depletion:

- Ozone (O_3) depletion occurs in the stratosphere due to the release of chlorofluorocarbons (CFCs) and other ozone-depleting substances.
- The stratospheric ozone layer protects us from harmful ultraviolet (UV-B) radiation.

Acidification of Soil and Water:

- Acidification occurs when acidic pollutants (such as Sulfur dioxide and nitrogen oxides) are released and causing acid rain, which harms soil quality, freshwater ecosystems, and aquatic life.

Eutrophication:

- Excessive nutrient runoff (nitrogen & phosphorus) into water bodies causing algal blooms, oxygen depletion, and disruption of aquatic ecosystems.

Photochemical Smog:

- When pollutants (nitrogen oxides & volatile organic compounds) react with sunlight leads to poor air quality, respiratory problems, and damage to vegetation

Depletion of Abiotic Resources (Elements and Fossil Fuels):

- Abiotic resources are minerals, metals, and fossil fuels (coal, oil, & natural gas), overexploitation and extraction of these resources can lead to their depletion.

Human Toxicity:

- The adverse effects of exposure to toxic substances like chemicals, heavy metals, and pollutants can harm human health through ingestion, inhalation, or skin contact.

Freshwater Aquatic Ecotoxicity:

- Aquatic organisms (fish, insects, algae, etc.) in rivers, lakes, and streams are affected by pesticides, heavy metals, and industrial chemicals.

Marine Aquatic Ecotoxicity:

- For oceans and coastal areas affect marine life, including fish, corals, and sea birds.

Terrestrial Ecotoxicity:

- Land ecosystems (Pesticides, heavy metals, and industrial chemicals) harm soil organisms, plants, and animals.

Water Pollution:

- Various contaminants (chemicals, pathogens & nutrients) that degrade water quality affect human health, aquatic life, and ecosystems.

Air Pollution:

- Particulate matter, nitrogen oxides, sulfur dioxide, and volatile organic compounds harm human health, damages vegetation, and contributes to climate change.

7.2.2 Procedures for determining environmental aspects and impacts

- Identify the process associated with activities of workplace.
- Consider the potential and actual impacts to the environment from each process and sub process.
- Identify the environmental aspects as the source of each impact to the environment.
- Identify legal requirements.
- Identify the potential for emergency situations.
- Consider the environmental aspects associated with legal requirement.
- Consider the ease of changing the environmental impacts.

7.3 Environmental Impact Assessment

- Environmental Impact Assessment (EIA) is a tool used to assess the significant effects of a project or development proposal on environment.
- EIAs make sure that project decision makers think about the likely effects on the environment at the earliest possible time and aim to avoid, reduce or offset those effects.
- This ensures that proposals are understood properly before decisions are made.

7.3.1 Stages of the EIA process

(Environmental Impact Assessment (EIA) - mygov.scot)

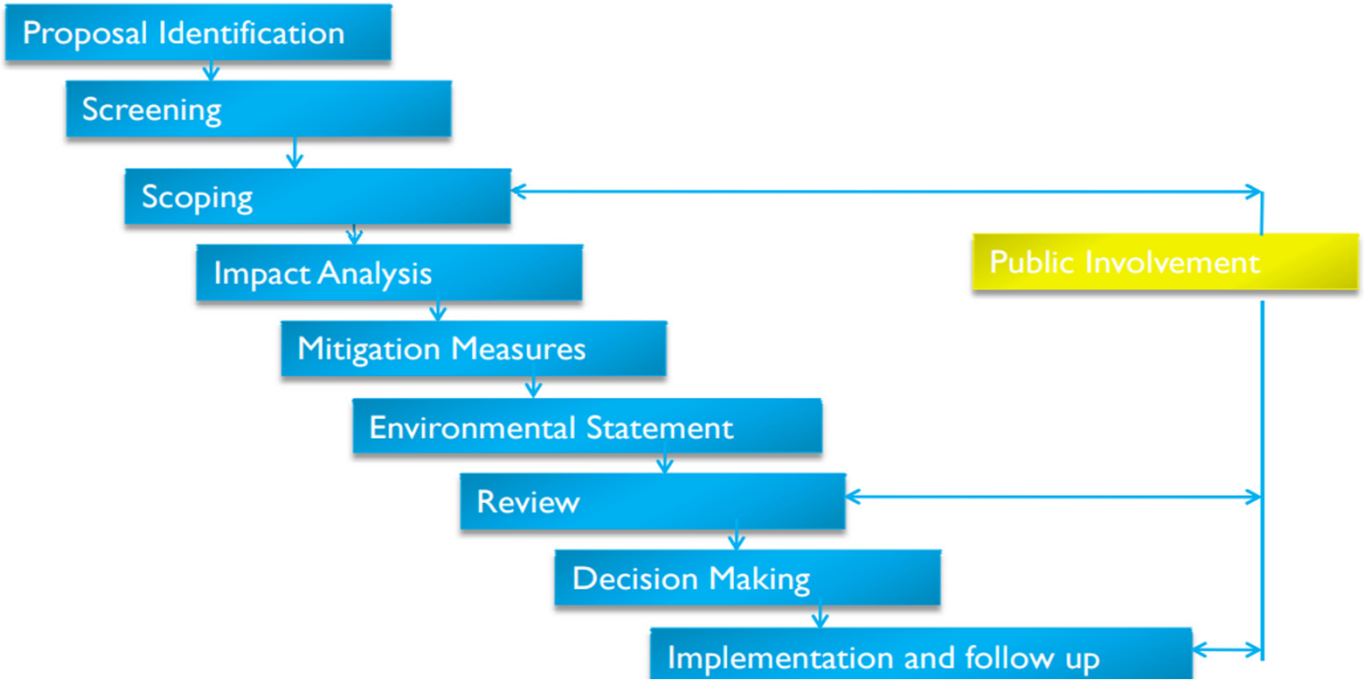
Stage	What's involved
1. Screening	Deciding if an EIA is required
2. Scoping	Deciding what needs to be covered in the assessment and reported in the 'EIA Report'
3. Preparing the EIA Report	The EIA report must include the likely significant environmental effects of the development
4. Making an application and consultation	The EIA Report and development application must be publicised (including electronic advertisement), interested parties and the public must be given an opportunity to give their views on it.
5. Decision making	The EIA Report and any comments made on it must be considered by the competent authority before they decide whether to give consent for the development. The decision notice must be published.
6. Post decision	The developer starts any monitoring required by the competent authority.

7.3.1 Stages of the EIA procedures in Rwanda

- Systematic identification and evaluation of potential impacts or effects of proposed projects, plans, programs or legislative actions relating to the physical- chemical, biological, cultural, and socio-economic components of the total environment was stated as the targeting procedures for Rwanda EIA . (Environmental Impact Assessment following Government procedure, REMA, Government of Rwanda, 2010.)

- It presents 10 procedures to follow while implementing EIA: Public involvement, Scoping, Screening, Impact analysis, Mitigation measures, Environmental statement, Review, Decision making, Implementation and follow up.

7.3.1 Stages of the EIA procedures in Rwanda cont'd



(Environmental Impact Assessment following Government procedure, REMA, Government of Rwanda, 2010.)

Thank you for your good attention

Q&A

References

- Seasonal Effects on Roadkill of Wild Vertebrates in a Stretch of a Brazilian Northeast Federal Highway, Cleverton Da Silva et al, Research gate, 2022.
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