

# **Workplace Environmental Management**

WEEK 9 – Project activities and their Impact  
of the Environment

University: Rwanda Polytechnic – IPRC Tumba

Lecturer: NSHIMIYIMANA Arcade

# Objectives

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

- Understand the concept of project nature
  - Understand the dimension of the environment considering nature
  - Understand the nature of impacts
  - Understand the ways to protect
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# 9.0 Definition

- A project is usually embedded in a specific environment consisting of a multitude influencing factors.
  - Factors being internal (within the organization), other being external (outside the organization) and influence the planning, execution, and outcome of a project.
  - The project environment is therefore an important part of project work and should be considered in the planning and control of a project.
  - Analyzing the project environment is an important step in recognizing the influence of various factors on the project and controlling them accordingly.
  - Best management of project environment requires nice planning, continuous monitoring, and flexible adaptation of project work to respective conditions.
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# 9.0 Definition cont'd

To analyze the factors on a project and their control, we need to follow:

- Adapting project goals and content to the identified opportunities and risks from the project environment.
  - Selecting and assembling the project team, considering the required competencies and resources.
  - Designing the project organization and processes in coordination with the company structure and culture.
  - Involving relevant stakeholders in the project work, for example through regular communication, information exchange, and participation in decisions.
  - Continuous monitoring and adjustment of the project work to changes in the project environment.
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# 9.1 Nature of the project

- The nature of a project is that it is a unique, temporary, multidisciplinary, and organized effort to create a specific output or deliverable. A project has predefined requirements and constraints that guide its planning, execution, and control. A project is undertaken by an organization for a specific purpose or goal.
  - The project engages with multiple environmental dimensions, including air quality, water resources, biodiversity, and land use.
  - It addresses both natural and human-made environments, tackling pollution, habitat destruction, and climate change in the complex and interconnected nature of these environmental aspects.
  - Effective project planning and management is very essential. ( Nature of the project, F. A. Mettler and M. A. Curry, Psychosurgical Problems, 2013).
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## 9.2 Dimension of the environment

- The environmental dimension refers to the aspects of our surroundings that interact with the environment.
  - In biology and ecology, the environment is all of the natural materials and living things, including sunlight.
  - The living and nonliving things that an organism interacts with or has an effect on are Trees, plants and animals etc.
  - Today the most reason for life to exist on Earth is due to the environment containing everything that we are connected with in our daily life.
  - Nature has provided us with clean and pure environment, and it should always be human endeavor to keep it clean.  
(3 Pillars of Sustainability, Explained (Guide & Examples, Simon, Sustainability Success, 2024)).
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# 9.2.1 Three dimensions of Environment

## Physical environment:

- The physical environment comprises all the abiotic components of environment like the lithosphere, the atmosphere and the hydrosphere.
  - All continents and islands make up the lithosphere; gases and water vapors in the air constitute the atmosphere and oceans, seas, rivers, lakes etc. belong in the hydrosphere.
  - All these components are abiotic but they support all forms of life on earth.
  - The lithosphere provides the soil and materials, the atmosphere provides the essential gases and is responsible for all weather phenomena and hydrosphere provides all water on the earth and is the source of all humidity present in air and all life forms.
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## 9.2.1 Three dimensions of Environment cont'd

### Biological environment:

- It comprises the living beings like micro-organism, plants and animals including man. Plants are most important because they produce all the matter used by micro-organism, plants themselves and animals.

### Social environment:

- It consists of man, placed at the top because of his ability to alter the environment as the most intelligent of all the living beings of environment.
  - Able to change the face of earth by making building, bridges, agricultural farms, transport lines, machinery etc. He cultivated the slope of mountains where agriculture was not possible.
  - The dimensions are interdependent and very much interlinked as well as interacting all the time (community, economy, society and culture).
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## 9.2.2 Scale/Space

- The scale or space dimension of the environment pertains to the physical extent or size of the environmental factors under consideration.
- This concept is important to understand the scope and scale of various environmental elements and their interactions.
- When planning and implementing projects, it is essential to grasp how different environmental components are distributed spatially to address potential impacts effectively.

### Spatial distribution of environmental elements:

- For project activities and their impact on the environment, the scale/space dimension involves awareness of spatial distribution of environmental elements such as air quality, water resources, biodiversity, and land use.
  - Thus, project planners identify where and how these elements are affected by their activities like, construction projects may affect air quality in a localized area, while changes in land use might impact biodiversity over a wider region.
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## 9.2.2 Scale/Space cont'd

### Geographical scope of environmental Impacts (EIs)

- The scale or space dimension also encompasses the geographical scope over which environmental impacts occur.
- This includes recognizing how environmental changes in one area can have cascading effects on broader regions.
- For example, deforestation in a specific locale can lead to regional climate changes, affecting weather patterns and water resources far beyond the immediate area of deforestation.
- Thus, understanding the geographical scope is essential for predicting and managing the ripple effects of environmental impacts.

### Spatial relationships in the environment

- Additionally, the scale or space dimension involves examining the spatial relationships between different components of the environment.
  - This means considering how changes in one environmental factor might influence others within the same space.
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## 9.2.2 Scale/Space cont'd

- For instance, alterations in land use can affect local water resources and biodiversity, creating complex interdependencies that need to be managed holistically.
- Recognizing these spatial relationships is key to developing integrated environmental management strategies.

### Multiscale environmental assessment

- Projects need to assess and address environmental issues at various scales, ranging from local to regional and global levels.
  - Local-scale assessments might focus on immediate impacts, such as soil erosion or air pollution in a particular area.
  - In contrast, regional and global assessments consider broader implications, like transboundary pollution or global biodiversity loss.
  - By evaluating environmental impacts across multiple scales, projects can implement more comprehensive and effective management and mitigation strategies. (Scaling and Uncertainty Analysis in Ecology: Methods and Applications, J. Wu, K.B. Jones, H. Li, and O.L. Loucks, Springer, 2006).
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## 9.2.3 Time

- The time dimension of the environment pertains to the temporal aspects of environmental changes and impacts. It informs how environmental conditions evolve over time and how these changes influence both natural ecosystems and human activities.
- The time dimension helps to track the progression of environmental processes and predict future conditions, which is essential to effectively plan and manage the environment.

### Understanding temporal dynamics in project activities

- Time dimension for project activities involves understanding how conditions evolve over time and the temporal dynamics of environmental processes.
  - This means recognizing that EIs are not static and can vary significantly over different time periods.
  - Some environmental changes may occur rapidly due to sudden events like natural disasters, while others may unfold gradually over decades, such as climate change and biodiversity loss.
  - Understanding these dynamics allows project planners to anticipate and address potential EIs more effectively.
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## 9.2.3 Time cont'd

### Seasonal variations and long-term trends

- Seasonal variations are an important factor in the time dimension of the environment. Many environmental processes exhibit seasonal patterns, such as changes in temperature, precipitation, and biological activities.
  - These seasonal cycles can influence the availability of resources, behavior of wildlife, and the functioning of ecosystems. Long-term trends, on the other hand, refer to persistent changes in environmental conditions over extended periods.
  - Examples include global warming, deforestation, and shifts in species distributions. Projects need to consider both seasonal variations and long-term trends to develop strategies that are responsive to short-term fluctuations and resilient to long-term changes.
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## 9.2.3 Time cont'd

### Rate of environmental changes

- The rate at which environmental changes occur is another critical aspect of the time dimension. Some changes happen gradually and allow for adaptation, while others occur abruptly and can cause significant disruption.
  - Gradual changes in climate patterns may give ecosystems and human communities time to adapt, whereas sudden events like floods or wildfires can have immediate and devastating impacts.
  - Understanding the rate of change helps in planning appropriate interventions and allocating resources efficiently to mitigate adverse effects.
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## 9.2.3 Time cont'd

### Implementing timely interventions

- Projects must account for the temporal scale of EIs to implement timely interventions, monitor changes effectively, and adapt strategies to address evolving environmental challenges.
  - Timely interventions are crucial in preventing minor issues from escalating into major problems.
  - This requires continuous monitoring and data collection to detect early signs of environmental changes and respond promptly.
  - Adaptive management strategies, which involve adjusting plans and actions based on new information and changing conditions, are essential for dealing with the dynamic nature of the environment.
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## 9.2.3 Time cont'd

### Monitoring and adapting strategies

- Effective monitoring involves the regular collection and analysis of environmental data to track changes over time.
  - This data provides valuable insights into the state of the environment and the effectiveness of implemented measures.
  - Projects should establish robust monitoring systems that can capture relevant temporal data and inform decision-making processes.
  - Adapting strategies based on monitoring results ensures that interventions remain relevant and effective in addressing current and future environmental challenges.
  - This builds resilience and sustainability of project outcomes ultimately contributing to the long-term health and stability of the environment.
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## 9.3 Nature of impact

- The activities undertaken by the project can lead to a variety of environmental impacts, encompassing both positive and negative outcomes.
  - This dual nature requires a careful and balanced approach to project planning and implementation.
  - Recognizing the potential benefits and drawbacks is crucial for mitigating adverse effects while maximizing positive contributions to environmental sustainability.
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# 9.3.1 Positive impacts

## Habitat restoration

- The project's potential to contribute significantly to habitat restoration. by rehabilitating degraded areas can help create healthier ecosystems that support a diverse array of flora and fauna. Restored habitats can offer new homes for wildlife, improve soil health, and increase water quality, ultimately contributing to the resilience of the ecosystem.

## Species conservation

- Protecting endangered species & enhancing biodiversity ensures the survival of various plant and animal species by creating protected areas, breeding programs, and measures to combat poaching and illegal wildlife trade for maintaining healthy ecosystems.

## Sustainable resource management

- Resource management practices involve using natural resources properly ensuring sustainable future generations. They include sustainable forestry, managing water and renewable energy, ensuring long-term environmental health and stability.
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## 9.3.2 Negative impacts

### Pollution

- Despite the positive aspects, most projects result in negative impacts if not carefully managed, construction activities, land development, and resource extraction can lead to pollution.
- This pollution can have far-reaching consequences, affecting air and water quality, and posing risks to both human health and wildlife. Effective pollution control measures are essential to mitigate these impacts.

### Deforestation

- Deforestation is another potential negative impact of the project, clearing of forests for development or resource extraction disrupts the natural habitats of many species, leading to a loss of biodiversity.
  - Trees play a critical role in sequestering carbon, regulating water cycles, and maintaining soil health. Their removal can weaken the resilience of ecosystems and exacerbate climate change.
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## 9.3.2 Negative impacts cont'd

### Habitat fragmentation

- Habitat fragmentation is closely related to deforestation and can have severe consequences for wildlife.
  - When large habitats are broken into smaller, isolated patches, it becomes difficult for species to migrate, find food, and reproduce.
  - This fragmentation reduces genetic diversity and increases the vulnerability of species to environmental changes and human activities.
  - Given these potential impacts, it is crucial to conduct thorough environmental impact assessments (EIAs).
  - EIAs help identify potential environmental risks and propose measures to mitigate negative impacts.
  - They involve a detailed analysis of how the project will interact with the environment and ensure that decisions are made with a clear understanding of potential outcomes.
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## 9.3.3 Monitoring and Mitigation Measures

- Tight monitoring and mitigation measures are important for addressing environmental concerns for early detection of negative impacts, enabling prompt corrective actions.
  - Mitigation measures like pollution control technologies, habitat corridors, and reforestation projects, can help minimize adverse effects and enhance EMS.
  - The project's activities have the potential to produce positive and negative EIs. A balanced approach that carefully considers these impacts is essential for achieving environmental sustainability.
  - By promoting habitat restoration, species conservation, and sustainable resource management, while also addressing pollution, deforestation, and habitat fragmentation, the project can contribute to a healthier and more resilient environment.
  - Effective planning, continuous monitoring, and adaptive management are key to ensuring that the project supports long-term environmental goals. (Keltic Petrochemicals Inc, L. Natural, et al, 2007).
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## 9.4 Ways to protect environment

- Implementing sustainable practices is essential for protecting environment. Recycling is a key practice that helps reduce waste, conserve natural resources, and decrease pollution.
  - By recycling materials such as paper, plastic, glass, and metal, we reduce the need for raw material extraction and minimize landfill waste.
  - This not only conserves resources but also leads to a healthier environment by reducing pollution and greenhouse gas emissions associated with the production of new materials.
  - Promoting energy efficiency is also crucial aspect of sustainable practices as it reduces greenhouse gas emissions and decreases reliance on fossil fuels, which are major contributors to climate change.
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## 9.4 Ways to protect environment cont'd

- Simple measures, such as using energy-efficient appliances, improving home insulation, and adopting renewable energy sources, can make a significant difference.
- It also help conserve energy, lower utility bills, and reduce the overall carbon footprint, contributing to climate change mitigation.

### Responsible land use

- Responsible land use is critical for sustainable environmental management through planning and managing land to meet the needs ensuring the land remains productive and healthy for future generations.
  - Strategies for responsible land use include promoting urban green spaces, protecting agricultural lands from urban struggle and encouraging sustainable agricultural practices.
  - Preserving natural landscapes and preventing deforestation, responsible land use maintain biodiversity, protect water resources, and reduce soil erosion.
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# 9.4 Ways to protect environment cont'd

## Conservation efforts

- Conservation efforts are essential to safeguard ecosystems and ensuring the survival of diverse species. Habitat restoration projects aim to rehabilitate degraded areas attracting native plants and animals to restore natural process
- These projects can range from reforestation and wetland restoration to removal of invasive species and rehabilitating waterways.
- Such efforts not only enhance biodiversity but also improve ecosystem services like water filtration, flood control, and carbon sequestration, which are crucial for environmental health.

## Wildlife protection

- Wildlife protection is a key component of conservation efforts by creating and enforcing regulations to stop overhunting, poaching, and illegal trade of wildlife.
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## 9.4 Ways to protect environment cont'd

- Establishing protected areas, such as national parks and wildlife reserves, provides safe habitats for endangered species and promotes biodiversity.
- Conservation programs also work on breeding endangered species in captivity and reintroducing them into the wild, ensuring their populations can recover and thrive.

### Biodiversity conservation

- Biodiversity conservation is crucial for maintaining healthy ecosystems. Diverse ecosystems are more resilient to better withstand environmental changes and disturbances.
  - Conservation strategies include protecting critical habitats, conserving genetic diversity, and promoting the sustainable use of biological resources.
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## 9.4 Ways to protect environment cont'd

- International cooperation and treaties, such as the Convention on Biological Diversity, play a significant role in coordinating global efforts to protect biodiversity and manage ecosystems sustainably.

### Environmental education

- Education is a powerful tool for promoting environmental protection and sustainability. By raising awareness and understanding of environmental issues, education can inspire individuals and communities to act.
  - Environmental education programs in schools, public awareness campaigns, and community workshops can teach people about the importance of conservation, sustainable practices, and how they can contribute to protecting the environment.
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## 9.4 Ways to protect environment cont'd

- Knowledge empowers people to make informed decisions and adopt behaviors that support environmental sustainability.

### Policy development

- Policy development is essential for creating a framework that supports environmental protection. Governments can implement laws and regulations that limit pollution, protect natural resources, promoting sustainable practices.
  - Policies such as carbon pricing, renewable energy incentives, and conservation funding can drive significant environmental improvements.
  - Effective environmental policies are often based on scientific research and involve collaboration between policymakers, scientists, and stakeholders to ensure they address the root causes of environmental issues.
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# 9.4 Ways to protect environment cont'd

## Community engagement

- It is vital for the success of environmental protection initiatives. Locals to avoid the concerns processes, conservation while participating in decision making related objects, and sustainable practices fosters a sense of ownership and responsibility.
- Community-led initiatives, such as community gardens, local clean-up drives, and conservation volunteer programs, can have a significant impact on protecting and restoring the environment.

## Public-private partnerships

- PPP enhances efforts to collaboration between governments, businesses, and non-governmental organizations (NGO) for joint project. Businesses can adopt corporate social responsibility practices that prioritize sustainability, while NGO advocate for policy changes and support grassroots conservation efforts. These partnerships drive innovation, create jobs, and promote sustainable development.
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Thank you for your good attention  
Q&A

# References

- Nature of the project, F. A. Mettler and M. A. Curry, Psychosurgical Problems, 2013.
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  - Scaling and Uncertainty Analysis in Ecology: Methods and Applications, J. Wu, K.B. Jones, H. Li, and O.L. Loucks, Springer, 2006.
  - Keltic Petrochemicals Inc., L. Natural, G. Facilities, M. Wharf, and N. Scotia, 2007.
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