RMs Manager Course

Case Study

Mining and Biodiversity

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Presentation Outline

- What is Biodiversity ?
- Why is it valuable ?
- What is the relevance to mining operations and why should companies consider it ?
- The importance of stakeholder engagement

- Integrating biodiversity into the mining project cycle :
  - Project Development
  - Operations
  - Closure Planning and Implementation
- Management Systems and Assessment tools

Introduction

What is Biodiversity?

The United Nations Convention on Biological Diversity (1992) defines biodiversity as :

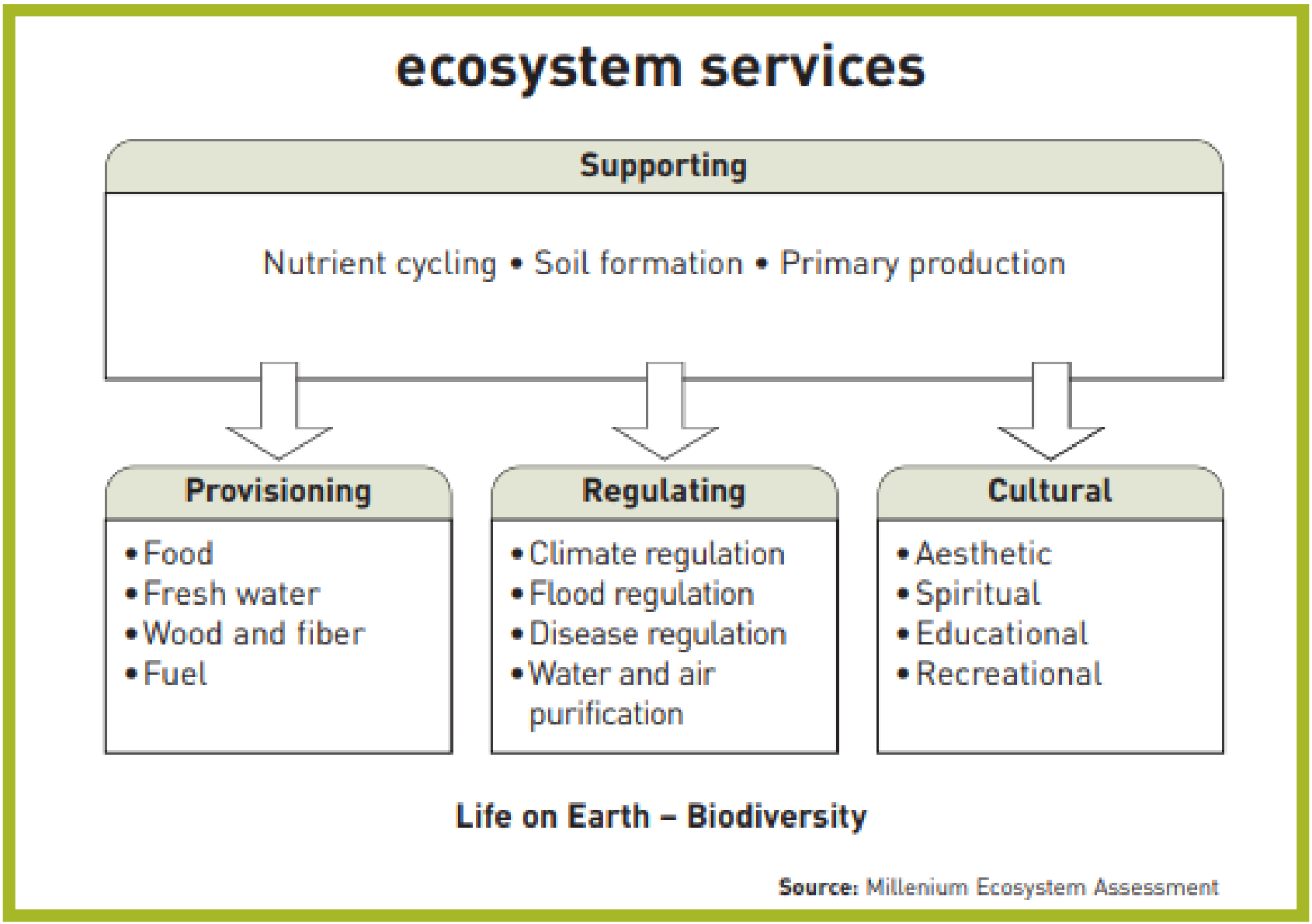
> *"The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."*

So, Biodiversity :

- Encompasses the variety and variability of life on Earth.
- Embraces all living organisms and their genetic diversity.

Different species **interact** with each other in a variety of **ecological processes** to form **ecosystems**.

Why is biodiversity valuable ?



Relevance to mining operations

Mining potentially affects biodiversity **throughout the life cycle of a project**, directly and indirectly.

Continuous **demand** for minerals, results in mining projects proposed in remote and biodiversity-rich ecosystems.

Companies can do a great deal to **minimize / prevent** such impacts.

Many mining companies implement an approach to managing biodiversity to establish and maintain their social or functional **'License to Operate'**.

Other important maters linked with responsible biodiversity management:

- Access to land
- Reputation (links to ‘license to operate’)
- Access to capital
- Increased investor confidence and loyalty
- Improved community relations
- Strong partnerships with NGOs
- Improved employee motivation
- Reduced risks and liabilities.

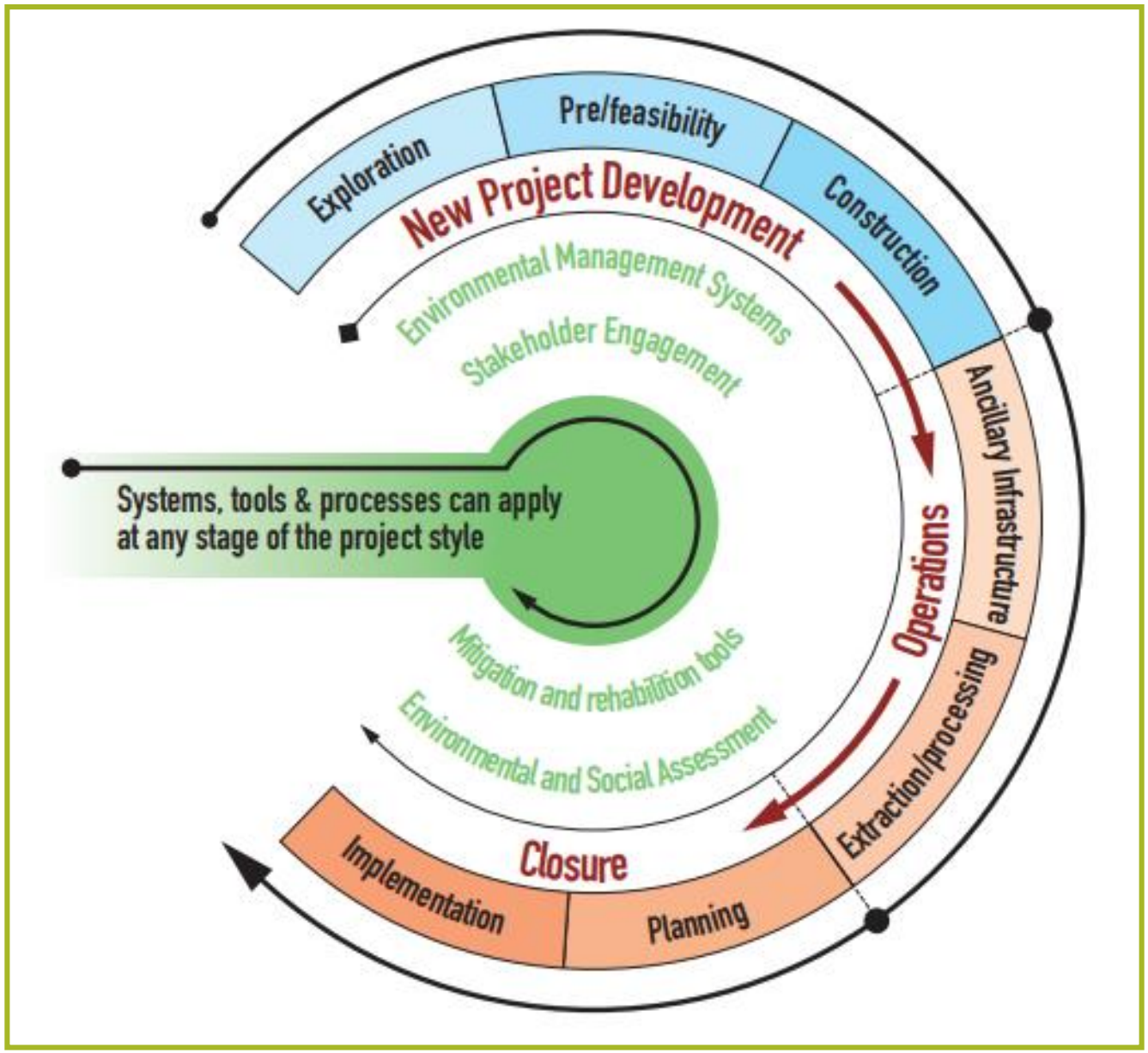
The importance of stakeholder engagement

Stakeholders are groups and individuals who affect or are affected by the activities of mining companies (local communities, government institutions, investors, NGOs, etc.)

Developing **trust, respect and partnership**, aimed at keeping the community informed of a mining company's operations, is essential to the success of a sustainable project.

Different stakeholders will have **varying interest** in the biodiversity of a given area.

Integrating biodiversity into the mining project cycle



Integrating biodiversity into Project Development

Goal : Discover economically viable mineral deposits.

Exploration

- Early stages of exploration (geophysical and geochemical survey, sampling)
- Exploration drilling

Feasibility stage

- Collection of information
- Design options specified in detail.
- Detailed production plans
- Layout plans showing preferred options for infrastructure, processing facilities, waste treatment and disposal sites.
- Establishment of closure plans and integration into project design

Construction

Integrating biodiversity into Project Development

Recommended practices :

- **Limiting** land clearing
- **Avoiding** road building wherever possible
- Using lighter and more **efficient** equipment
- **Positioning** drill holes and trenches away from sensitive areas
- **Reclaiming** roads and tracks that are no longer needed
- Using **native** vegetation to **revegetate** land cleared during exploration.

Integrating biodiversity into Operations

Ancillary Infrastructure

Extraction - Processing

- Clearing of overburden / pit development
- Land clearance, access routes, progressive expansion.
- Also, effects on aquatic or wetland biodiversity through altering hydrologic / hydrogeological regimes.
- Disposal of waste materials or tailings

Integrating biodiversity into Closure Planning and Implementation

Closure planning : Objectives and Targets

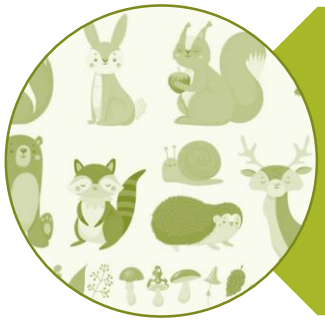
- Regulatory Requirements and guidelines
- Consultation with key holders
- Understanding competing interests, etc.

Rehabilitation objective :

*'To establish a **sustainable native ecosystem** that is as **similar** to the **pre-existing ecosystem** as can be achieved within the limits of recognized **good practice rehabilitation techniques** and the post-mining environment'.*

Integrating biodiversity into Closure Planning and Implementation

Revegetation using important functional species (e.g., for erosion control or nitrogen fixation)



Re-establishment of **key species** (rare or threatened plant and fauna)

Rehabilitation that is **stable**, **sustainable** and includes the use of native species where possible.

Management Systems and Assessment Tools

Environmental and Social Impact Assessment (ESIA)

Environmental Management Systems (EMS)

Environmental and Social Impact Assessments

ESIA is an important tool for ensuring that:

- **Biodiversity** is **integrated** into project planning and decision making
- Relevant environmental and social **interfaces are considered**

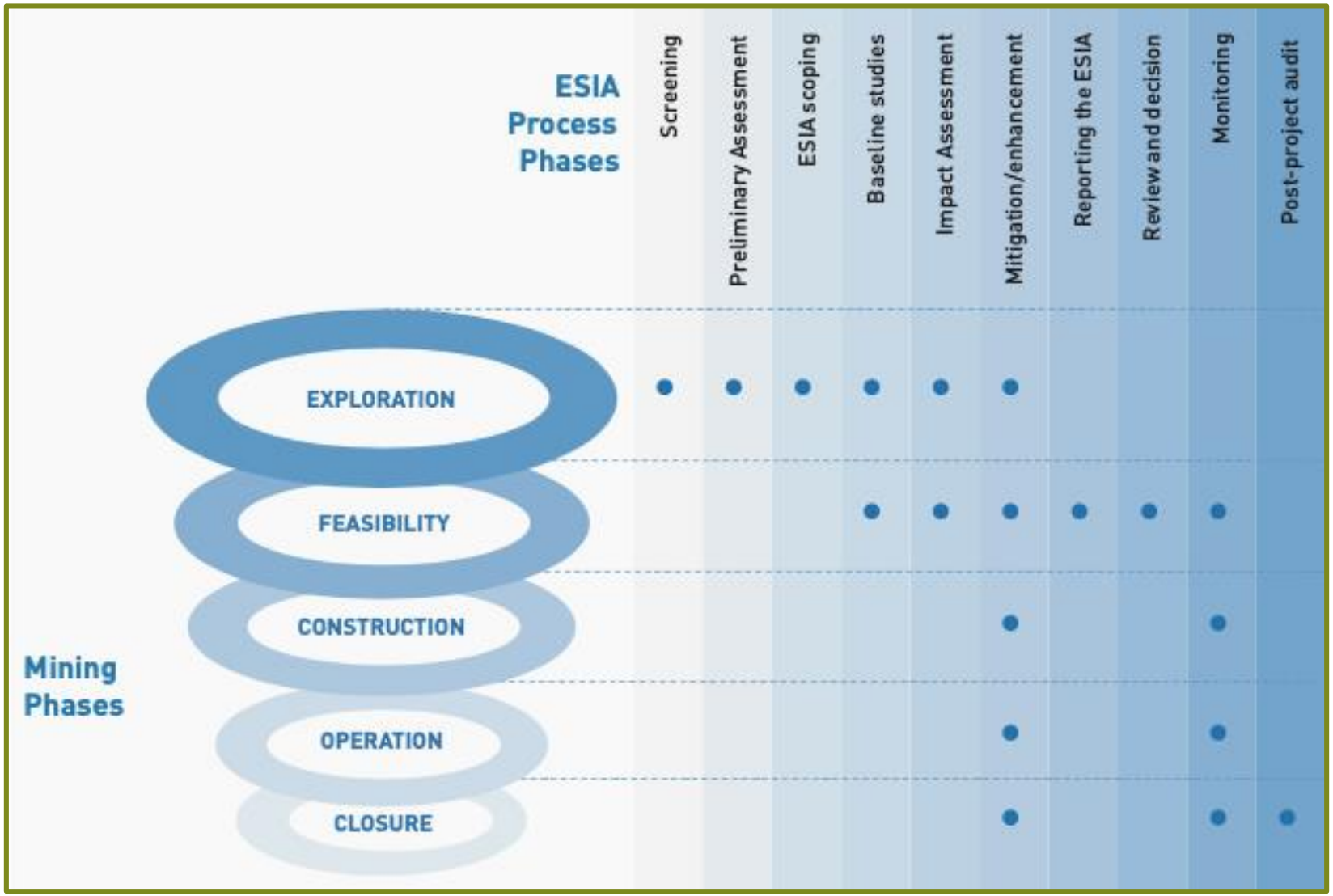
The ESIA process provides a structured approach to considering the environmental, economic and social consequences of options and alternatives when developing a mining project.

Environmental and Social Impact Assessments

Fundamental components of an ESIA Assessment:

- Evaluation of relevant **levels of biodiversity** : ecosystems, species and genetic biodiversity
- Consideration of the **structural and functional relationships** and how they will be affected by the proposed project
- Collection of **detailed data** on key biodiversity indicators
- Full range **evaluation of impacts** (primary, secondary, cumulative and included)
- Recognition of the **importance of community** and indigenous knowledge on local biodiversity aspects and stakeholder participation
- Clarification of the **criteria** used to assess impacts
- Consideration of **impacts and mitigation measures** for biodiversity

Environmental and Social Impact Assessments



Applicability of ESIA to the stages in the mining cycle

Environmental Management Systems (EMS)

Mining operations must either be certified or compliant to the **ISO14001** series.

EMS provides the **framework** for the management of biodiversity during **operations and closure planning**

The EMS framework addresses biodiversity for mining companies through :

- Integration of biodiversity into the **environmental policy**
- **Documentation and assessment** of local biodiversity in consultation with appropriate stakeholders
- Undertaking **identification and assessment** of biodiversity **aspects/risks**
- Maintaining a **register** of legal and other **requirements**

Environmental Management Systems (EMS)

- **Planning and developing** preventative and mitigative **measures** for significant biodiversity aspects
- Implementing preventative and mitigative **responses** to identified biodiversity aspects
- Monitoring, measuring and reporting **performance** on biodiversity management
- Managing the **review** of procedures and outcomes
- Adopting a continuous **improvement approach**

Thank you for your attention!