Co-funded by the European Union

GSMESKILL

MODULE 8

ENVIRONMENTAL ACCOUNTABILITY AND ASSESSMENT & EVALUATION OF SUSTAINABILITY MEASURES IN BUSINESS	
Duration:	5 hours
Learning objectives:	1. Understanding and Applying Accountability Measures 2. Techniques for Effective Environmental Monitoring 3. Leveraging Technology for Environmental Monitoring and Control 4. Using and Promoting Sustainable Technologies
Sub-Modules:	Environmental Accountability Monitoring Skills Technology Use Sustainable Technologies
Resources and devices:	Websites & Databases Online Reports & Case Studies Educational Videos Experiential Learning
Assessment:	Classroom Discussions & Reflections Participation in Group Activities Role-Playing & Debates Case Study Analysis Report Sustainability Problem-Solving Exercise
Skills/abilities developed:	Accountability, environmental ethics, transparency Monitoring, data analysis, reporting Technological proficiency, environmental monitoring, data management. Sustainable technology, innovation, implementation

eduforma ...strumenti su misura per la persona

EUROPEAN KNOWLEDGE SPOT

Ustadi empower • connect • prosper

NGO NEST Berlin

EQUNEC FOUNDATION EF

SADRAT INSTITUTE - YOUR PARTNER IN SUSTAINABLE DEVELOPMENT -

PRIZMA Fundacija za izboljšanje zaposlitvenih možnosti

yadaversity

Submodule 8.1

Environmental Accountability: Understanding and applying accountability measures.

→ Skills:

1. Accountability
2. Environmental ethics
3. Transparency

ENVIRONMENTAL ACCOUNTABILITY
Activity 1: Environmental Accountability, Ethical Decision-Making, and Corporate Sustainability
Duration: 1 hour
Specific Learning Objectives 1.Define environmental accountability and explain its significance in corporate sustainability. 2. Identify key environmental regulations, standards, and corporate social responsibility (CSR) policies.
Methodology, Resources and Devices Case Study Analysis & Ethical Decision-Making Exercises, Debates on Corporate Ethics Digital Resources, Online Reports & Case Studies, Videos
Description of the activity and Key Concepts 1. Understanding Environmental Accountability and Its Role in Corporate Sustainability Definition of Environmental Accountability Environmental accountability refers to the responsibility of businesses to recognize, measure, and mitigate their environmental impact. It involves transparent reporting,

adherence to environmental laws, and ethical decision-making in sustainability practices.

In corporate sustainability, environmental accountability ensures that businesses:
- Act responsibly towards the environment.
- Follow ethical standards in resource use and waste management.
- Balance long-term economic growth with social and environmental well-being.

2. Key Environmental Regulations, Standards, and CSR Policies

A. Environmental Regulations

Companies must comply with local and international environmental laws to ensure sustainable business practices. Key regulations include:

- Kenyan Environmental Management and Coordination Act (EMCA) – Governs environmental impact assessments (EIAs).
- National Environment Management Authority (NEMA) Guidelines – Regulate industrial emissions, waste disposal, and pollution control.
- Paris Agreement on Climate Change – Encourages carbon reduction strategies.
- ISO 14001 (Environmental Management System) – Guides businesses in implementing sustainability frameworks.

B. Corporate Social Responsibility (CSR) Policies

CSR in environmental accountability focuses on:

- Transparency in sustainability reporting (e.g., carbon footprint disclosure).
- Investment in community-based environmental projects (e.g., tree planting, water conservation).
- Green supply chains – Ensuring suppliers also comply with environmental standards.

3. Skills for Environmental Accountability

To practice environmental accountability, professionals must develop the following skills:

Accountability – Accepting responsibility for environmental impacts and acting proactively.
Environmental Ethics – Ensuring business decisions align with ethical sustainability principles.
Transparency – Openly sharing environmental performance data with stakeholders.

Critical Thinking & Ethical Decision-Making – Evaluating the long-term consequences of business actions on society and the environment.

Application in Business:

- Assessing how corporate decisions affect target communities, markets, and natural resources.
- Reflecting on whether business strategies align with long-term social, cultural, and economic goals.
- Acting responsibly by making sustainable and ethical choices in business operations.

4. Ethical Decision-Making in Environmental Accountability

Businesses often face ethical dilemmas related to sustainability, such as:

- Should a company invest in sustainable production, even if it increases short-term costs?
- How should a business balance profit-making with environmental responsibility?
- Should a company disclose environmental risks, even if it damages its reputation?

To guide ethical decision-making, businesses can apply the Seven-Step Guide to Ethical Decision-Making (Davis, 1999):

5. The Seven-Step Guide to Ethical Decision-Making in Environmental Accountability

Step 1: State the Problem Clearly

- Ask: *"Why does this decision make me uncomfortable?"*
- Example: *A company is dumping industrial waste into a nearby river, causing harm to local communities.*

Step 2: Check the Facts

- Identify key stakeholders, laws, and sustainability goals.
- Example: *Does the company have alternatives? What do environmental laws say?*

Step 3: Identify Relevant Factors

- Consider internal company policies, external legal requirements, and environmental ethics.

Step 4: Develop a List of Options

- Think beyond "yes" or "no" – consider who to involve and what actions to take.
- Example: *Should the company invest in a water treatment plant, or shift to cleaner production methods?*

Step 5: Test the Options Using Ethical Criteria

- Harm Test: Which option causes the least environmental damage?
- Publicity Test: Would the company be comfortable if its decision was made public?
- Defensibility Test: Can the decision be defended legally and ethically?
- Reversibility Test: Would the company be comfortable with this decision if the roles were reversed?
- Colleague Test: What do sustainability experts recommend?
- Professional Test: Does the decision align with ISO 14001 and ESG (Environmental, Social, Governance) standards?
- Organization Test: What does the company's ethics policy state?

Step 6: Make a Choice and Implement It

- Example: *The company commits to zero waste discharge and invests in cleaner production methods.*

Step 7: Review the Decision and Prevent Future Issues

- Identify ways to prevent similar ethical dilemmas in the future.
- Example: *Develop a long-term sustainability strategy, train employees on environmental ethics, and advocate for policy improvements.*

6. The Role of Businesses in Sustainable Decision-Making

Companies have a duty to be environmentally accountable by:

- Following ethical frameworks to ensure sustainability.
- Complying with regulations and setting higher sustainability standards.
- Engaging in corporate social responsibility (CSR) to benefit communities and the environment.
- Being transparent with sustainability data and business practices.

By applying environmental ethics, transparency, and accountability, businesses can contribute to a greener, more sustainable future while maintaining profitability.
Assessment Sustainable Business Model Presentation
Skills/Abilities developed Accountability, environmental ethics, transparency.
Further readings, activities, materials, best practices Greenwashing: When Companies Aren't as Sustainable as They Claim https://www.youtube.com/watch?v=2NsBcVrPQok CSR: What is Corporate Social Responsibility? Definition Examples Benefits https://www.youtube.com/watch?v=Zc102xiah1M

Co-funded by the European Union

GSMESKILL

Developing VET Entrepreneurial Green Mindset and skills for Small-Business Development

MODULE 8.1

Environmental Accountability

CONTENTS

- **Activity 1: Environmental Accountability, Ethical Decision-Making, and Corporate Sustainability**

Applying the Seven-Step Guide to Ethical Decision-Making in an Environmental Context in Kenya

Title:

Sustainable Agriculture vs. Economic Growth: An Ethical Dilemma in Kenya

Objective:

This activity will help participants practice Davis's Seven-Step Guide to Ethical Decision-Making in a real-world Kenyan environmental context.
Participants will critically analyze an ethical dilemma, apply the seven-step model, and develop a well-reasoned decision.

Scenario

Kenya’s economy relies heavily on agriculture, with tea and coffee being major export crops. However, deforestation and excessive water usage caused by large-scale farming are leading to serious environmental degradation, including:

- Deforestation of the Mau Forest (a key water catchment area).
- Water shortages affecting local communities and wildlife.
- Soil erosion and declining biodiversity.

A multinational agribusiness company is planning to expand its tea plantations into protected land near the Mau Forest.

The company argues that:

This expansion will create jobs and boost Kenya’s economy.

It will increase exports, generating foreign income.

The government will benefit from higher tax revenues.

However, environmental activists and local communities strongly oppose this plan, warning of:

Severe deforestation leading to loss of biodiversity.

Water scarcity that will hurt small-scale farmers and wildlife.

Long-term ecological damage that outweighs short-term economic gains.

The Kenyan government must decide whether to approve the company’s request or protect the environment.

Instructions

Participants will apply Davis's Seven-Step Guide to Ethical Decision-Making to analyze and decide what should be done in this case.

Step 1: State the Problem Clearly

- What is the core ethical dilemma?
- Who are the key stakeholders affected?

Discussion Questions:

- Is economic growth more important than environmental sustainability?
- Can a compromise be reached between business expansion and environmental protection?

Instructions

Step 2: Check the Facts

- What data and evidence exist about deforestation in Kenya?
- What are the economic benefits of expanding the plantation?
- How severe is the environmental impact of agricultural expansion?

Activity:

- Divide participants into groups and assign them roles: Government officials, agribusiness executives, environmental activists, and local farmers.
- Each group researches and presents facts that support their position.

Instructions

Step 3: Identify Relevant Factors (Ethical Principles, Laws, and Policies)

- Legal Perspective: Does Kenyan law allow deforestation for economic purposes?
- Ethical Perspective: What ethical principles apply? (e.g., sustainability, justice, corporate responsibility)
- Social Perspective: How will this decision impact future generations?

Activity:

- Groups must identify at least two ethical principles that support their position.

Instructions

Step 4: Develop a List of Options
•What are the possible solutions?
•Can the government and company find a sustainable alternative?

Possible Options:
☐Approve the expansion and allow partial deforestation under strict regulations.
☐Reject the expansion and enforce strict environmental protections.
☐Allow the expansion only if the company invests in reforestation and water conservation.
☐Seek a third option, such as using degraded land instead of protected forests.

Activity:
•Each group proposes one solution and justifies it.

Instructions

Step 5: Test the Options

For each option, answer:

Is it legal?
Is it fair to all stakeholders?
Does it respect the environment?
What are the short-term and long-term consequences?

Activity:
•Groups critique each other’s proposals by highlighting risks and benefits.

Instructions

Step 6: Make a Choice

Each group must:
•Vote on the best ethical decision.
•Justify their choice using the ethical principles discussed.

Activity:
•Role-play a government debate where participants defend their decision in front of a “Parliament” (other participants).

Instructions

Step 7: Review and Learn from the Decision

- What were the challenges in making an ethical decision?
- What can be improved in Kenya's environmental policies?

Final Reflection:

- If you were the Kenyan President, what would you do?
- How can Kenya balance economic growth with environmental sustainability?

Co-funded by
the European Union

GSMESKILL

THANK YOU

DISCLAIMER:
GSMESKILL PROJECT N. 101091883 FUNDED BY THE EUROPEAN UNION. VIEWS AND OPINIONS EXPRESSED ARE HOWEVER THOSE OF THE AUTHOR(S) ONLY AND DO NOT NECESSARILY REFLECT THOSE OF THE EUROPEAN UNION OR THE EUROPEAN EDUCATION AND CULTURE EXECUTIVE AGENCY (EACEA). NEITHER THE EUROPEAN UNION NOR EACEA CAN BE HELD RESPONSIBLE FOR THEM.

ENVIRONMENTAL ACCOUNTABILITY

Activity 2: Corporate Social Responsibility (CSR) and Ethical Decision-Making in Business

Duration: 1 hour

Specific Learning Objectives

1. Analyze case studies of companies with strong environmental accountability measures.
2. Demonstrate ethical decision-making in environmental responsibility through scenario-based exercises.

Methodology, Resources and Devices

Case Study Analysis & Ethical Decision-Making Exercises, Role-Playing Scenarios
Digital Resources, Online Reports & Case Studies

Description of the activity and Key Concepts

1. Introduction

In a rapidly evolving global landscape, corporate social responsibility (CSR) and ethical decision-making have become central to discussions among businesses, policymakers, and society. Companies today must balance profitability with ethical considerations and societal well-being. This article explores the significance, challenges, and strategies for integrating CSR and ethical decision-making into corporate frameworks.

2. Understanding Corporate Social Responsibility (CSR)

CSR refers to businesses' voluntary initiatives to address social, environmental, and economic concerns while considering the interests of multiple stakeholders, including:
Communities
Employees
The Environment
Consumers and Investors

A. Core Elements of CSR

CSR extends beyond mere legal compliance and focuses on proactive engagement in:

- Philanthropy & Community Engagement – Supporting education, healthcare, and social development programs.
- Environmental Sustainability – Reducing carbon footprints, waste management, and sustainable sourcing.
- Ethical Labor Standards – Ensuring fair wages, safe working conditions, and human rights protections.
- Corporate Governance & Transparency – Upholding ethical business practices, accountability, and anti-corruption policies.

3. The Ethical Imperative in Decision-Making

A. What is Ethical Decision-Making?

Ethical decision-making involves assessing the consequences of business actions through a moral lens, ensuring fairness, integrity, and accountability. Businesses face ethical dilemmas where they must choose between competing interests, such as profit maximization and social responsibility.

B. Ethical Decision-Making Frameworks

To navigate complex business environments, organizations rely on established ethical decision-making models, such as:

1The Utilitarian Approach – Choosing the option that produces the greatest benefit for the largest number of people.
2The Rights-Based Approach – Respecting and protecting the fundamental rights of all stakeholders.
3The Fairness or Justice Approach – Ensuring decisions are fair, unbiased, and just for all involved.
4The Virtue Ethics Approach – Focusing on moral character, honesty, and integrity.

4. CSR and Ethical Decision-Making: A Symbiotic Relationship

CSR and ethical decision-making are interconnected concepts that shape responsible corporate behavior. Businesses that prioritize ethics in their decision-making naturally integrate social and environmental considerations into their strategic objectives.

A. Benefits of CSR and Ethical Decision-Making in Business

Trust & Reputation Enhancement – Consumers and investors prefer brands committed to ethical practices.
Risk Mitigation – Ethical decision-making helps businesses avoid legal liabilities and reputational damage.
Long-Term Sustainability – Ethical CSR practices promote financial stability and social impact.
Employee Engagement & Retention – Workers prefer ethical companies that support employee well-being and fair labor practices.

5. Challenges in Implementing CSR and Ethical Decision-Making

Despite the importance of CSR and ethics in business, companies face significant obstacles in implementation:

A. Profit Maximization Pressures

- Short-term revenue goals often conflict with long-term sustainability.
- Example: A company may opt for cheaper but environmentally harmful production methods to reduce costs.

B. Complex Global Supply Chains

- Companies sourcing raw materials globally struggle to monitor ethical labor standards.
- Example: Child labor issues in fast-fashion supply chains.

C. Greenwashing & Ethical Washing

- Some companies exaggerate or falsify their CSR efforts to mislead consumers.
- Example: Misleading carbon neutrality claims in marketing campaigns.

D. Regulatory Compliance vs. Ethical Standards

- Compliance with laws does not always equate to ethical conduct.
- Example: Legal tax loopholes allow corporations to avoid paying fair taxes while still being “compliant.”

6. Strategies for Strengthening CSR and Ethical Decision-Making

A. Embedding Ethics in Corporate Culture

Train employees on environmental ethics and sustainability best practices. Establish whistleblower policies to detect ethical violations early.

B. Strengthening Transparency & Accountability

Publish sustainability reports with verified environmental and social impact data. Partner with independent watchdog organizations to ensure compliance.

C. Leveraging Technology for Ethical Decision-Making

Use AI-powered monitoring systems to track ethical risks in supply chains. Implement blockchain technology to enhance transparency in product sourcing.

Assessment

Classroom Discussions & Ethical Reflection Questions, Ethical Debate Sessions

Specific Skills/Abilities developed

critical thinking, analytical, and evaluation skills

Co-funded by the European Union

GSMESKILL

Developing VET Entrepreneurial Green Mindset and skills for Small-Business Development

MODULE 8.1

Environmental Accountability

CONTENTS

Activity 2: Corporate Social Responsibility (CSR) and Ethical Decision-Making in Business

Case Study Analysis: Safaricom Kenya - Leading in Environmental Accountability

1. Background

Safaricom PLC is Kenya's largest telecommunications company, known for its commitment to sustainability and environmental accountability. The company has adopted various green initiatives, including reducing carbon emissions, using renewable energy, and incorporating sustainable business practices.

Industry: Telecommunications

Key Environmental Accountability Areas: Carbon footprint reduction, renewable energy use, waste management, sustainable supply chains

2. Safaricom's Environmental Accountability Measures

A. Renewable Energy and Carbon Footprint Reduction

Problem: Kenya's energy sector still relies on non-renewable sources, leading to high carbon emissions.

Solution:
•Green Energy Initiative: Safaricom invested in solar-powered base stations to reduce reliance on fossil fuels.
•Energy Efficiency: Transitioned to energy-efficient network infrastructure, reducing overall energy consumption.
•Carbon Footprint Reporting: Annually discloses carbon emission data in sustainability reports.

Impact:
✓ Reduced carbon emissions by 28% in five years.
✓ Contributes to Kenya's climate goals under the Paris Agreement.
✓ Encourages green investment in the telecom sector.

2. Safaricom's Environmental Accountability Measures

B. E-Waste Management & Recycling

Problem: Kenya generates huge amounts of electronic waste (old phones, batteries, routers, etc.), creating environmental hazards.

Solution:
- Established electronic waste collection points across the country.
- Partnered with WEEE Centre Kenya to safely recycle old electronic devices.
- Introduced device trade-in programs to encourage responsible disposal of gadgets.

Impact:
- ✓ Diverted hundreds of tons of e-waste from landfills.
- ✓ Raised awareness among customers on safe disposal of electronics.
- ✓ Supports the circular economy by reusing materials from old devices.

2. Safaricom's Environmental Accountability Measures

C. Water & Plastic Waste Reduction

Problem: Plastic pollution is a major challenge in Kenya, particularly in urban areas.

Solution:
- Banned single-use plastics within Safaricom's offices and operations.
- Introduced paperless billing and digital services to reduce paper consumption.
- Encouraged employees and suppliers to adopt waste management best practices.

Impact:
- ✓ Eliminated plastic waste from all company premises.
- ✓ Saved millions of liters of water annually through sustainable practices.
- ✓ Influenced other corporations to reduce plastic use.

2. Safaricom's Environmental Accountability Measures

D. Sustainable Supply Chain & Green Business Practices

Problem: Many businesses fail to monitor environmental impact in their supply chains.

Solution:
- Ensured suppliers adhere to environmental and ethical standards.
- Incorporated green procurement by prioritizing eco-friendly products and services.
- Developed sustainability training programs for employees and partners.

Impact:
- ✓ Suppliers comply with sustainability benchmarks.
- ✓ Increased adoption of eco-friendly procurement policies in Kenya.
- ✓ Encouraged other businesses to prioritize sustainability in operations.

3. Analysis Using Environmental Accountability Frameworks

A. Triple Bottom Line (People, Planet, Profit) Analysis

Aspect	Safaricom's Approach
People (Social Impact)	Created green jobs, trained employees on sustainability, improved e-waste recycling awareness.
Planet (Environmental Impact)	Reduced carbon footprint, implemented solar energy, eliminated plastic waste.
Profit (Economic Impact)	Improved operational efficiency, attracted sustainability-conscious investors, reduced long-term energy costs.
Safaricom successfully balances business growth with environmental responsibility.	

3. Analysis Using Environmental Accountability Frameworks

B. ESG (Environmental, Social, Governance) Evaluation

Factor	Implementation at Safaricom
Environmental (E)	Renewable energy, carbon reduction, e-waste recycling, plastic ban.
Social (S)	Employee sustainability training, community engagement, digital inclusion.
Governance (G)	Transparent sustainability reporting, supplier compliance with green standards.
Safaricom is a model company in ESG accountability in Kenya's corporate sector.	

Co-funded by
the European Union

GSMESKILL

THANK YOU

DISCLAIMER:
GSMESKILL PROJECT N. 101091883 FUNDED BY THE EUROPEAN UNION. VIEWS AND OPINIONS EXPRESSED ARE HOWEVER THOSE OF THE AUTHOR(S) ONLY AND DO NOT NECESSARILY REFLECT THOSE OF THE EUROPEAN UNION OR THE EUROPEAN EDUCATION AND CULTURE EXECUTIVE AGENCY (EACEA). NEITHER THE EUROPEAN UNION NOR EACEA CAN BE HELD RESPONSIBLE FOR THEM.

Submodule 8.2

Monitoring Skills: Techniques for effective environmental monitoring

→ Skills:

1. Monitoring
2. Data Analysis
3. Reporting

MONITORING SKILLS
Activity 1: Key Environmental Indicators for Business Sustainability
Duration: 1 hour
Specific Learning Objectives 1. Explain the role of environmental monitoring in business sustainability. 2. Identify key environmental indicators (e.g., carbon footprint, water usage, waste generation).
Methodology, Resources and Devices Hands-on Environmental Monitoring Activities, Case Study Analysis Digital & Online Resources
Description of the activity and Key Concepts 1. Understanding Environmental Monitoring <u>A. What is Environmental Monitoring?</u> **Environmental monitoring is the process of collecting, analysing, and assessing data on environmental conditions to ensure business activities do not cause harm to the environment.** This includes: ● Measuring air, water, and soil quality.

- Tracking resource consumption and waste production.
- Using technology, audits, and sustainability metrics to assess environmental impact.

B. Why is Environmental Monitoring Important for Businesses?

Businesses integrate environmental monitoring to: Ensure compliance with legal regulations (e.g., Kenya's NEMA regulations, ISO 14001).

Minimize environmental risks and prevent financial penalties.
Reduce resource waste (water, energy, materials) and lower costs.
Measure and reduce their carbon footprint to combat climate change.
Build trust and transparency with stakeholders and consumers.
Promote sustainable supply chains and ethical sourcing.
Drive innovation through green technologies.

Example: Safaricom Kenya monitors carbon emissions and e-waste recycling to align its operations with sustainability goals.

2. Key Environmental Indicators for Business Sustainability

Businesses use Environmental Key Performance Indicators (e-KPIs) to measure their environmental impact. These indicators help them assess efficiency, sustainability, and regulatory compliance.

A. Carbon Footprint (Greenhouse Gas Emissions - GHGs)

Definition: The total amount of CO_2 and other greenhouse gases (GHGs) emitted by a business.

Why It Matters: Businesses must reduce emissions to meet climate action goals and minimize their environmental footprint.

Measurement:

- Tons of CO_2 emitted per year (Scope 1, 2, and 3 emissions).
- Energy consumption from fossil fuels (diesel, coal, natural gas).
- Carbon offset initiatives (tree planting, renewable energy investments).

Example: Safaricom Kenya reduced its carbon footprint by 28% by switching to solar-powered base stations.

B. Water Usage & Water Footprint

Definition: Measures the total volume of water consumed by a business in its operations.
Why It Matters: Essential for water conservation and resource efficiency, especially in water-scarce regions like Kenya.

Measurement:

- Cubic meters (m^3) of water used per year.
- Percentage of recycled water used.
- Water efficiency improvements (e.g., low-flow fixtures, rainwater harvesting).

Example: Coca-Cola Kenya implemented water recycling, reducing consumption by 40%.

C. Waste Generation & Management

Definition: Tracks the total amount of solid, liquid, and hazardous waste produced by a business.

Why It Matters: Helps businesses reduce landfill waste, promote recycling, and comply with disposal regulations.

Measurement:

- Tons of waste generated per year.
- Percentage of waste recycled vs. landfilled.
- Hazardous waste disposal methods.

Example: Safaricom Kenya runs an e-waste recycling program, collecting and safely disposing of old phones and electronic devices.

D. Energy Consumption & Renewable Energy Use

Definition: Measures how much electricity and fuel a business uses and the percentage from renewable sources.

Why It Matters: Reducing energy consumption lowers carbon emissions and operational costs.

Measurement:

- Kilowatt-hours (kWh) of electricity used per year.
- Percentage of energy sourced from renewables (solar, wind, hydro).
- Energy efficiency improvements (LED lighting, smart energy systems).

Example: KenGen Kenya generates over 80% of its electricity from renewable sources, reducing national dependence on fossil fuels.

E. Air Quality & Pollution Control

Definition: Monitors emissions of harmful pollutants (e.g., SO_2, NOx, particulate matter) from industrial activities.

Why It Matters: Helps reduce air pollution, protect public health, and meet clean air regulations.

Measurement:

- Concentration of pollutants (μg/m³).
- Number of air quality violations per year.
- Use of pollution control technology (e.g., scrubbers, filters).

Example: Bamburi Cement installed dust filtration systems, reducing factory air pollution.

F. Sustainable Sourcing & Supply Chain Transparency

Definition: Ensures that raw materials are ethically sourced without harming the environment.
Why It Matters: Helps businesses avoid deforestation, labor exploitation, and environmental degradation.

Measurement:

- Percentage of suppliers with sustainability certifications (e.g., Fair Trade, FSC, Rainforest Alliance).
- Traceability of raw materials (e.g., timber, coffee, minerals).
- Sustainability audits of suppliers.

Example: Unilever Kenya sources sustainable tea for its brands, ensuring fair wages and environmental protection.

G. Biodiversity & Ecosystem Protection

Definition: Measures a company's impact on natural habitats, wildlife, and ecosystem services.
Why It Matters: Businesses must protect forests, rivers, and biodiversity to support sustainability goals.

Measurement:

- Hectares of land restored or reforested.

- Species protection programs funded.
- Impact assessments on local ecosystems.

Example: Kenya's Rhino Ark Charitable Trust works with businesses to conserve forest ecosystems.

3. Why Businesses Must Invest in Environmental Monitoring

Environmental monitoring ensures that businesses:
- Stay compliant with environmental laws.
- Reduce operational costs by improving resource efficiency.
- Enhance corporate reputation through transparent sustainability practices.
- Contribute to long-term sustainability goals like carbon neutrality.
- Gain competitive advantages by adopting green technologies.

Assessment

Hands-on & Practical Learning

Skills/Abilities developed

Monitoring, data analysis, reporting.

Further readings, activities, materials, best practices

https://climateactiontransparency.org/wp-content/uploads/2023/06/Kenya-Climate-Smart-Agriculture-Monitoring-and-Evaluation-Framework.pdf
https://complexdiscovery.com/global-business-and-sustainability-the-impact-of-the-paris-agreement-and-corporate-esg-standards/

Co-funded by the European Union

GSMESKILL

Developing VET Entrepreneurial Green Mindset and skills for Small-Business Development

MODULE 8.2
Monitoring Skills

CONTENTS

- **Activity 1: Key Environmental Indicators for Business Sustainability**

Activity: Environmental Monitoring in Action – Waste Audit at the Workplace or School

Objective:

To help participants develop monitoring skills by collecting, analyzing, and interpreting data on waste generation in a real-world setting.

Materials Needed:

✓ Gloves (for handling waste safely)
✓ Waste collection bins (separate for plastic, paper, organic waste, and general waste)
✓ Data recording sheets or mobile phones for digital tracking
✓ Weighing scale (optional, for measuring waste by weight)

Step-by-Step Instructions

1. Divide into Monitoring Teams (5-6 participants per team)

Assign roles:

-Data Collectors – Sort and record types of waste.
-Weighing Experts – Measure amounts of waste (optional).
-Reporters – Analyze trends and propose solutions.

2. Conduct the Waste Monitoring Exercise

Step 1: Identify the Monitoring Area

- Choose a specific location (e.g., office pantry, school cafeteria, classroom, business floor).

Step 2: Collect & Categorize Waste

- Gather waste from the past 24 hours.
- Sort waste into categories (plastic, organic, paper, metal, electronic, hazardous).

2. Conduct the Waste Monitoring Exercise

Step 3: Record Observations
•Count the number of items in each category or weigh them.
•Note any patterns (e.g., high plastic waste, food wastage).

Step 4: Analyze & Interpret Data
•Which waste type is most common?
•What does this indicate about waste management habits?
•Are there opportunities to reduce waste (e.g., switching to reusable materials)?

Step 5: Present Findings & Recommendations
•Teams present a short report on their findings.
•Suggest at least one improvement (e.g., introducing a recycling bin, reducing paper usage, composting organic waste).

Key Learning Outcomes:

✓ Develop monitoring skills by systematically tracking environmental data.

✓ Improve data analysis abilities to identify sustainability gaps.

✓ Enhance decision-making by proposing actionable environmental solutions.

Co-funded by
the European Union

GSMESKILL

THANK YOU

DISCLAIMER:
GSMESKILL PROJECT N. 101091883 FUNDED BY THE EUROPEAN UNION. VIEWS AND OPINIONS EXPRESSED ARE HOWEVER THOSE OF THE AUTHOR(S) ONLY AND DO NOT NECESSARILY REFLECT THOSE OF THE EUROPEAN UNION OR THE EUROPEAN EDUCATION AND CULTURE EXECUTIVE AGENCY (EACEA). NEITHER THE EUROPEAN UNION NOR EACEA CAN BE HELD RESPONSIBLE FOR THEM.

Submodule 8.3

Technology Use: Leveraging technology for environmental monitoring and control

→ Skills:

1. Technological proficiency
2. Environmental monitoring
3. Data management

TECHNOLOGY USE
Activity 1: Modern Technologies for Environmental Monitoring and Digital Tools for Tracking Environmental Performance
Duration: 1 hour
Specific Learning Objectives 1. Identify modern technologies used for environmental monitoring (e.g., IoT sensors, GIS, AI). 2. Demonstrate the use of digital tools and software for tracking environmental performance.
Methodology, Resources and Devices Hands-on Environmental Monitoring Activities, Group Research & Technology Integration Projects Digital & Online Resources, Technology & Tools for Practical Learning, Digital Tools & Software for Sustainability Tracking
Description of the activity and Key Concepts <u>1. The Role of Technology in Environmental Monitoring:</u> Environmental monitoring has evolved with cutting-edge technologies that enable businesses, governments, and organizations to track, analyse, and predict environmental changes. These innovations help in: - Real-time environmental data collection to improve sustainability strategies. - Predictive analytics for preventing climate-related disasters.

- Enhancing transparency and accountability in business operations.
- Engaging citizens in environmental conservation through digital platforms.

2. Key Modern Technologies Used in Environmental Monitoring

A. Data-Driven Insights & Sensor Networks

Definition: Deploying sensor networks enables real-time collection of environmental data, which is essential for monitoring pollution, water quality, deforestation, and climate conditions.

Key Applications:

- ✓ Air Quality Monitoring: IoT-enabled air sensors detect pollutants like PM2.5, NO_2, and SO_2 in urban areas.
- ✓ Water Quality Sensors: Detect contaminants like lead, nitrates, and pH levels in water bodies.
- ✓ Soil Sensors: Measure moisture levels, nutrient content, and pollution levels for agriculture and land management.

Example: Nairobi deploys air quality sensors to monitor pollution and inform urban policy changes.

B. Satellite Imagery & Geographic Information Systems (GIS)

Definition: Satellites provide real-time earth observation data, while GIS helps visualize and analyse environmental changes.

Key Applications:

- ✓ Tracking Deforestation: Identifying forest loss and illegal logging.
- ✓ Monitoring Climate Change: Measuring rising sea levels and glacial melting.
- ✓ Disaster Response: Assessing flood and wildfire risks.

Example: Planet Labs captures daily images of Earth to track forest cover and urban expansion.

C. Predictive Modeling & Artificial Intelligence (AI)

Definition: AI-powered machine learning models analyse historical environmental data to predict future trends.

Key Applications:

- ✓ Air Pollution Forecasting: Predicting pollution spikes and recommending preventive actions.
- ✓ Water Scarcity Models: Using AI to forecast drought risks and optimize water usage.
- ✓ Wildfire Prediction: Detecting high-risk areas for early intervention.

Example: AI-driven climate models simulate greenhouse gas emission impacts, helping policymakers develop mitigation plans.

D. Blockchain for Transparency & Sustainability

Definition: Blockchain is a decentralized digital ledger that enhances supply chain transparency and environmental accountability.

Key Applications:

- ✓ Supply Chain Traceability: Tracks the origin of raw materials (e.g., timber, coffee, minerals).
- ✓ Carbon Credit Trading: Tokenizing carbon offset credits to incentivize businesses to adopt eco-friendly practices.

Example: Veridium Labs uses blockchain to tokenize carbon offsets, making them accessible for businesses and individuals.

E. Smart Cities & IoT Integration

Definition: Smart cities use IoT-enabled sensors to optimize waste management, energy consumption, and water distribution.

Key Applications:

- ✓ Smart Waste Management: Optimized garbage collection routes reduce fuel consumption and emissions.
- ✓ Smart Energy Grids: IoT-based smart grids balance energy supply and demand.
- ✓ Adaptive Streetlights: Smart streetlights adjust brightness based on real-time traffic.

Example: Enel X uses IoT to implement demand response solutions, improving energy efficiency.

F. Citizen Engagement & Crowdsourced Environmental Monitoring

Definition: Digital platforms encourage citizens to participate in environmental data collection and reporting.

Key Applications:

- ✓ Mobile Apps: Apps like iNaturalist enable users to report plant and animal sightings, contributing to biodiversity databases.
- ✓ Crowdsourced Air Quality Monitoring: AirVisual collects real-time air quality data from sensors worldwide.

Example: Kenyan communities use mobile apps to report illegal dumping and pollution cases.

G. Emerging Technologies in Environmental Monitoring

Quantum Sensors: Ultra-sensitive sensors that detect pollutants, pathogens, and radiation with unprecedented accuracy.

Biodegradable Sensors: Eco-friendly electronic sensors used for soil health, water quality, and wildlife monitoring.

Example: Quantum-enhanced monitoring is being researched to improve precision in environmental data collection.

3. Digital Tools & Software for Environmental Performance Tracking

A. IoT Platforms & Cloud-Based Environmental Dashboards

Definition: IoT platforms aggregate data from environmental sensors and display real-time analytics via cloud dashboards.

Examples of IoT Tools:

- ✓ IBM Environmental Intelligence Suite – AI-powered analytics for climate risk assessment.
- ✓ Microsoft's AI for Earth – Provides cloud computing resources for sustainability projects.

Example: Companies use cloud dashboards to track corporate carbon footprints and ensure regulatory compliance.

B. Geographic Information System (GIS) Software

Definition: GIS tools visualize and analyse spatial environmental data.

Popular GIS Software:

- ✓ ArcGIS – Used for climate mapping, land-use analysis, and disaster response.
- ✓ Google Earth Engine – Processes satellite imagery for deforestation tracking.

Example: Governments use GIS to map urban expansion and plan sustainable infrastructure.

C. Machine Learning & AI Software for Predictive Analysis

Definition: AI software analyses big data to predict environmental patterns and risks.

Examples of AI-Based Tools:

- ✓ TensorFlow for Climate Science – AI-powered climate risk forecasting.
- ✓ DeepMind's Climate Change AI – Models energy usage and efficiency trends.

Example: AI predicts climate anomalies and informs disaster management strategies.

D. Blockchain-Based Carbon Tracking Platforms

Definition:
Blockchain enables decentralized, tamper-proof tracking of carbon emissions and offsets.

Examples:

- ✓ Veridium – Tokenizes carbon credits for trading.
- ✓ CarbonX – Rewards companies for reducing emissions.

Example: Businesses use blockchain to ensure transparency in sustainable sourcing.

4. The Future of Environmental Monitoring Technologies

Why Businesses Should Invest in Modern Monitoring Technologies:
- Enhances compliance with environmental regulations.
- Reduces operational costs by optimizing energy and resource use.

- Improves corporate transparency and stakeholder trust.
- Enables better decision-making through predictive analytics.

Assessment

Concept-Based Discussions & Reflection Questions, Case Study Analysis & Data Interpretation

Skills/Abilities developed

Technological proficiency, environmental monitoring, data management.

Further readings, activities, materials, best practices

Sky to Sea: Exploring Modern Environmental Monitoring Technologies: https://www.youtube.com/watch?v=taZC9fvhGhY

Co-funded by the European Union

GSMESKILL

Developing VET Entrepreneurial Green Mindset and skills for Small-Business Development

MODULE 8.3
Technology Use

CONTENTS

Activity 1: Modern Technologies for Environmental Monitoring and Digital Tools for Tracking Environmental Performance

Activity: Using Mobile Apps & Sensors for Environmental Monitoring

Objective:

Participants will learn how to leverage technology for real-time environmental monitoring by using mobile apps and digital sensors to track air quality, water usage, or carbon footprint in their surroundings.

Materials Needed:

Smartphones or tablets (with internet access)
Environmental monitoring apps (choose based on available tools)
Portable sensors (if available, e.g., air quality sensors, smart meters)
Data recording sheets

Suggested Free Mobile Apps for Monitoring
AirVisual – Measures air pollution (PM2.5, CO_2 levels) in real-time.
My Carbon Footprint – Tracks daily carbon emissions.
Water Footprint Calculator – Helps assess individual or business water usage.
Glasport Bio or EcoTrash – Monitors waste and recycling habits.

Step-by-Step Instructions

1. Divide into Small Groups (3-5 Participants Per Team)

Each team will select a specific environmental factor to monitor:

Air quality (pollution levels, CO_2 concentration)
Water consumption (daily usage, leaks, waste)
Carbon footprint (transportation, energy use)
Waste generation (plastic, food, electronic waste)

2. Conduct the Environmental Monitoring Exercise

Step 1: Choose a Technology for Monitoring

- Teams download a monitoring app or use a portable sensor.
- Ensure each participant understands how to use the tool.

2. Conduct the Environmental Monitoring Exercise

Step 2: Collect Real-Time Data

- For air quality – Use the AirVisual app or an air quality sensor in different locations (outdoor vs. indoor).
- For water usage – Track personal water consumption over an hour (e.g., taps, bottles, flushing).
- For carbon footprint – Use a footprint calculator to estimate emissions from travel, food, and electricity use.
- For waste management – Log different types of waste generated in a short period.

2. Conduct the Environmental Monitoring Exercise

Step 3: Record and Compare Findings

•Note key environmental trends based on the data.
•Compare different locations or behaviors (e.g., does air pollution vary indoors vs. outdoors? Is water being wasted in unexpected ways?).

3. Analyze & Propose Solutions

Step 4: Interpretation & Discussion

•What does the data reveal about environmental impact?
•Are there trends or unexpected findings?
•How can businesses or individuals improve environmental practices using this data?

Step 5: Present Findings & Propose Digital Solutions

•Each team presents a short report on their monitoring results.
•Propose at least one technological solution to reduce environmental impact (e.g., smart meters, AI-based waste sorting, IoT-enabled water monitoring).

Key Learning Outcomes:

Hands-on experience using digital tools for environmental monitoring.
Understanding of real-time data collection and analysis.
Ability to recommend technology-driven solutions for sustainability.

Co-funded by
the European Union

GSMESKILL

THANK YOU

DISCLAIMER:
GSMESKILL PROJECT N. 101091883 FUNDED BY THE EUROPEAN UNION. VIEWS AND OPINIONS EXPRESSED ARE HOWEVER THOSE OF THE AUTHOR(S) ONLY AND DO NOT NECESSARILY REFLECT THOSE OF THE EUROPEAN UNION OR THE EUROPEAN EDUCATION AND CULTURE EXECUTIVE AGENCY (EACEA). NEITHER THE EUROPEAN UNION NOR EACEA CAN BE HELD RESPONSIBLE FOR THEM.

Submodule 8.4

Sustainable Technologies: Using and promoting sustainable technologies

→ **Skills:**

1. Sustainable technology
2. Innovation
3. Implementation

SUSTAINABLE TECHNOLOGIES
Activity 1: Sustainable Technologies in Business: Principles, Benefits, and Evaluation
Duration: 1 hour
Specific Learning Objectives 1. Explain the principles and benefits of sustainable technologies in business. 2. Evaluate different sustainable technologies (e.g., renewable energy, circular economy models).
Methodology, Resources and Devices Sustainability Impact Assessment & Data Analysis, Group Research, Capstone Project: Designing a Sustainable Business Model Digital & Online Resources
Description of the activity and Key Concepts <u>1. Understanding Sustainability in Business</u> Sustainability in business refers to the impact companies have on the environment, society, and economy. A sustainable business strategy ensures that companies minimize their environmental footprint while maximizing long-term profitability. Key Global Issues Addressed by Sustainable Business Strategies: ● Climate change and greenhouse gas emissions. ● Depletion of natural resources (e.g., water, fossil fuels). ● Income inequality and fair working conditions.

- Pollution and waste management.
- Gender and racial inequality.

A. The Business Case for Sustainability

Many businesses assume that sustainability is costly, but research suggests the opposite. Sustainable companies tend to outperform their competitors in profitability, brand reputation, and long-term resilience.

Environmental, Social, and Governance (ESG) Metrics
Businesses use ESG metrics to evaluate how ethical and sustainable their operations are. Companies with high ESG ratings tend to be more profitable and resilient in the long term.

Example: According to McKinsey, companies with strong sustainability strategies outperform the market in medium- and long-term growth.

2. Principles of Sustainable Technologies in Business

A. Efficiency & Resource Optimization

Businesses should maximize efficiency and minimize waste by using eco-friendly production methods.

Example:

- Coca-Cola Kenya's "World Without Waste" initiative focuses on 100% recyclable packaging.
- Kenya Breweries Limited reuses and recycles glass bottles to reduce waste.

B. Renewable & Clean Energy Usage

Businesses should transition to renewable energy sources to reduce dependence on fossil fuels.

Example:

- KenGen Kenya generates over 80% of its electricity from renewable sources (geothermal, hydro, and wind energy).
- Safaricom Kenya reduced CO_2 emissions by 28% by shifting to solar-powered base stations.

C. Circular Economy & Waste Reduction

A circular economy promotes reusing, recycling, and repurposing materials to eliminate waste.

Example:

- Coca-Cola's sustainable packaging strategy focuses on recyclable PET bottles.
- Bamburi Cement uses industrial waste as an alternative fuel source, reducing landfill waste.

D. Carbon Neutrality & Emission Reduction

Businesses should actively reduce their carbon footprint by implementing low-carbon production methods.

Example:

- Safaricom Kenya invests in green energy projects to offset its carbon footprint.
- Companies use electric mobility solutions to reduce emissions (e.g., Roam electric motorcycles in Kenya).

E. Smart & Digital Technologies for Sustainability

The use of AI, IoT, and Big Data improves environmental monitoring and sustainability tracking.

Example:

- AI-driven smart grids optimize electricity use, reducing energy waste.
- IoT-enabled water sensors help industries detect leaks and reduce water wastage.

F. Green Supply Chains & Ethical Sourcing

Companies should ensure that their supply chains follow ethical and environmentally friendly practices.

Example:

- Unilever Kenya sources sustainable tea under Rainforest Alliance Certification.

- Eco-friendly fashion brands in Kenya use organic cotton and biodegradable materials.

G. Regulatory Compliance & Environmental Accountability

Businesses must adhere to local and global environmental laws to ensure sustainability.

Example:

- Many Kenyan businesses comply with NEMA's (National Environment Management Authority) environmental standards.
- Companies adopt ISO 14001 environmental management standards.

3. Benefits of Sustainable Technologies in Business

A. Protecting Brand Reputation & Risk Mitigation

Why It Matters:

- Avoids public relations crises caused by environmental violations.
- Builds trust with customers, investors, and regulatory bodies.

Example:

- Oil spills, labor exploitation, and unethical waste disposal can destroy a brand's reputation.
- By investing in sustainable supply chains, businesses protect themselves from scandals.

B. Competitive Advantage Through Purpose-Driven Business

Why It Matters:

- Companies that integrate sustainability into their business model attract skilled employees and loyal customers.
- Research shows that 89% of executives believe purpose-driven businesses have higher employee satisfaction.

Example:

- Eco-conscious brands like Patagonia and Unilever outperform competitors by integrating sustainability into their core strategy.

C. Expanding Market for Sustainable Goods

Why It Matters:

- Consumers increasingly prefer sustainable products.
- 73% of global consumers are willing to change consumption habits for sustainability.

Example:

- Millennials and Gen Z consumers are willing to pay more for eco-friendly products.
- Companies adopting sustainable production methods see increased sales and customer loyalty.

D. Industry-Wide Collaboration & Impact

Why It Matters:

- Companies working together can drive systemic change in sustainability.

Example:

- Unilever led an industry-wide adoption of sustainable palm oil, reducing deforestation.
- Kenyan companies partner with the government to reduce plastic waste.

4. Evaluating Sustainable Technologies in Business

Businesses must evaluate the effectiveness of sustainable technologies before implementing them. Key factors to consider include:

A. Environmental Impact Assessment

- Does the technology reduce pollution, waste, and carbon emissions?
- Is it energy-efficient and resource-saving?

Example: AI-powered smart grids help businesses reduce energy consumption.

B. Economic Feasibility

- Is the technology cost-effective in the long run?
- Does it offer a strong return on investment (ROI)?

Example: Solar energy reduces long-term electricity costs for businesses.

C. Social Responsibility & Ethics

- Does the technology promote fair labor practices?
- Is it ethical and inclusive in its supply chain?

Example: Blockchain technology helps verify ethical sourcing in supply chains.

5. The Future of Sustainable Technologies in Business

Why Businesses Should Invest in Sustainable Technologies:
Compliance with environmental laws reduces legal risks.
Green innovations drive profitability and operational efficiency.
Sustainable products attract more eco-conscious consumers.
Collaboration among businesses amplifies global sustainability impact.

- Businesses should integrate renewable energy, circular economy models, and digital sustainability tools.
- Policymakers must support innovation and sustainability regulations.
- Consumers should support brands that prioritize environmental responsibility.

Assessment

Concept-Based Discussions & Reflection Questions, Sustainable Business Strategy Report

Skills/Abilities developed

Sustainable technology, innovation, implementation.

Further readings, activities, materials, best practices

https://fsc.org/en/blog/sustainable-business-practices

The Future of Climate-Tech Is Everything:
https://www.youtube.com/watch?v=nkpUoNSllnU

Co-funded by the European Union

GSMESKILL

Developing VET Entrepreneurial Green Mindset and skills for Small-Business Development

MODULE 8.4

Sustainable technologies

CONTENTS

- **Activity 1: Sustainable Technologies in Business: Principles, Benefits, and Evaluation**

Activity: Designing a Sustainable Business Model

Objective:
Students will apply the principles of sustainable technology by developing a sustainable business model that incorporates green innovations to improve business sustainability.

Scenario

1. Divide the Class into Teams (4-6 students per team)
Each team will act as a business development unit creating a new company or improving an existing one using sustainable technologies.

Scenario

2. Assign a Business Sector to Each Group

Each group selects or is assigned a business sector where they will integrate sustainable technologies. Possible sectors:
Manufacturing – e.g., reducing industrial waste and energy use.
Agriculture – e.g., using precision irrigation, organic farming, solar-powered cold storage.
Retail & Packaging – e.g., switching to biodegradable packaging.
Hospitality & Tourism – e.g., promoting eco-friendly tourism.
Energy & Transport – e.g., developing electric mobility solutions.

Scenario

3. Develop a Sustainable Business Mode

Each group will design a sustainable business that follows at least 3 principles of sustainable technology.
Key Components to Include in Their Plan:
Company Name & Sector
Sustainability Goals (e.g., "reduce carbon footprint by 30% in 5 years")
Sustainable Technologies Used (e.g., solar power, AI for efficiency)
Circular Economy Plan (How will waste be reduced/reused?)
Environmental & Social Impact (Who benefits and how?)
Profitability & Business Growth (How does sustainability improve revenue?)

Example:
A team creating an eco-friendly transport company could include:
•Electric buses & solar charging stations (Renewable Energy).
•AI-powered route optimization (Efficiency).
•Recycled materials for bus interiors (Circular Economy).

Scenario

4. Present Business Plans

Each team presents their sustainable business model in a 3-minute pitch, explaining:
•How they integrated sustainable technology principles.
•How their business reduces environmental impact.
•How they will ensure profitability & social benefits.
Bonus: The class votes on the most innovative & sustainable idea.

Co-funded by
the European Union

GSMESKILL

THANK YOU

DISCLAIMER:
GSMESKILL PROJECT N. 101091883 FUNDED BY THE EUROPEAN UNION. VIEWS AND OPINIONS EXPRESSED ARE HOWEVER THOSE OF THE AUTHOR(S) ONLY AND DO NOT NECESSARILY REFLECT THOSE OF THE EUROPEAN UNION OR THE EUROPEAN EDUCATION AND CULTURE EXECUTIVE AGENCY (EACEA). NEITHER THE EUROPEAN UNION NOR EACEA CAN BE HELD RESPONSIBLE FOR THEM.