

# **Assessment Processes for Sustainability and Sustainable Development**

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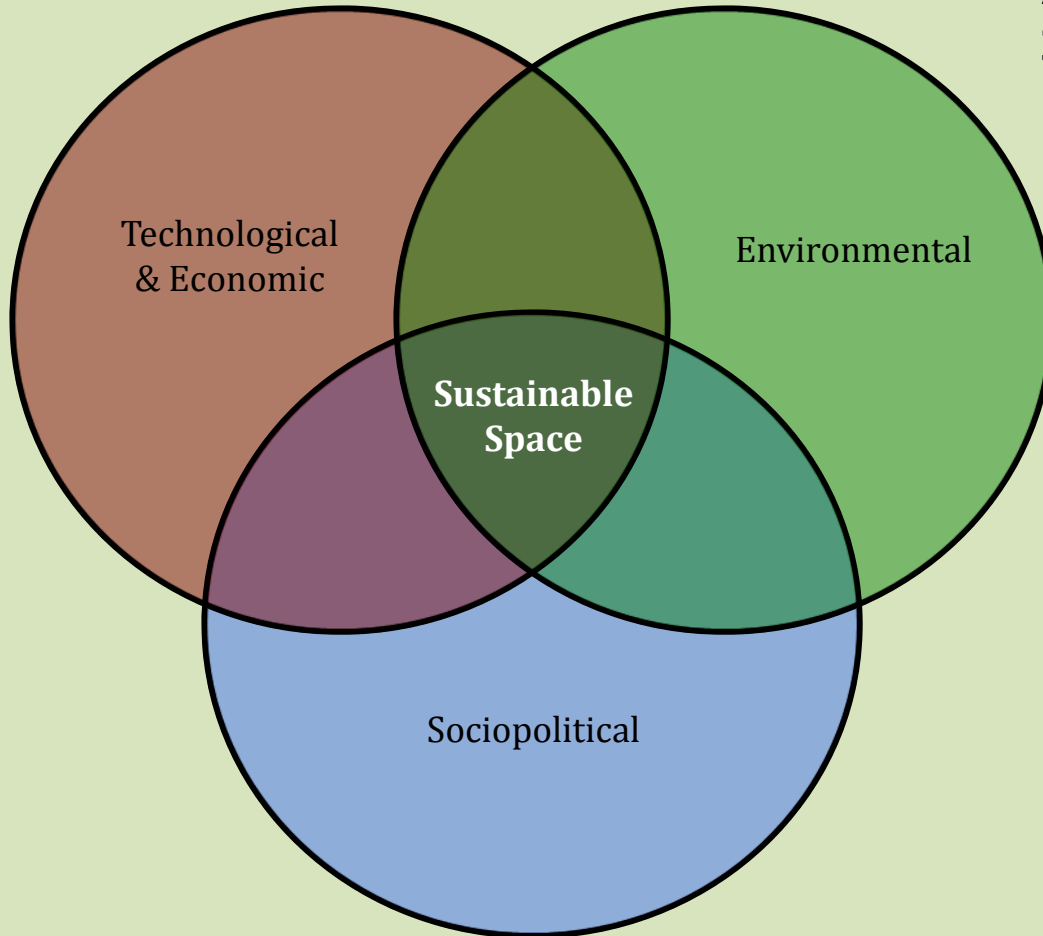
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# Sustainable Development

A path toward a steady state condition in which the quality of life is satisfactory for everyone, population is at a steady state level, and resources are continuously available forever.

# Sustainable Development Principles

1. Full-cost principle: All users should pay the full cost
2. Cost-effectiveness principle: Achieve policy objectives at the lowest cost
3. Property rights principle: Distribute rights to the appropriate entities
4. Sustainability principle: Respect the needs of future generations
5. Information principle: Public education to have an informed public



### Triple Bottom Line

1. Profitable Enterprise
2. Healthy Environment
3. Social Value

# Triple Bottom Line Assessment Methods

A simple approach is to make three lists to put down on paper all of the positive and negative impacts of the project considering social value, economic value, and ecological or environmental value. This helps to see and understand connections and dimensions.

# Project Assessment Using Appropriate Questions

1. Ecological impact
2. Economic opportunities and costs
3. Impact on human well-being
4. Government, corporate and public incentives

# Project Assessment of Organizations and Institutions

1. Responsibility for implementation and management
2. Cooperation and inter-relationships
3. Degree of organizational support
4. Develop organizational-project implementation matrix

# The Natural Step Framework

1. Reduce dependence on mining and fossil fuels
2. Reduce dependence on persistent, non-biodegradable, unnatural substances
3. Reduce nature-consuming activities that degrade ecosystems
4. Increase efficiency of resource use



# Sustainability Hierarchy Framework of Marshall and Toffel (2005)

1. Is survival of humans endangered?
2. Is life expectancy reduced?
3. Impact on species extinction and human rights?
4. Is quality of life reduced?

# **Sustainability questions proposed by Hodge (2004)**

1. Are there effective engagement processes?
2. Will well-being be improved?
3. Will the environment be improved?
4. Will the economy be improved?
5. Is the project accepted by the local people?
6. Are the institutional arrangements in place?
7. Has an appropriate assessment been completed?

# Summary Sustainability Assessment

1. Does this project provide economic benefits?
2. Does this project provide environmental benefits?
3. Is there equity for all elements of society?
4. Was there appropriate stakeholder participation and agreement

# Ecosystem-Based Management

1. Connections and interdependence
2. Cumulative impacts of multiple activities
3. Multiple objectives and a range of benefits
4. We manage actions that impact ecosystems

# Integrated Ecosystem Assessment Process

1. Scoping, objectives, concerns for ecosystem management
2. Identify indicators and decision criteria
3. Risk analysis
4. Assessment and quantification of values of indicators and general state
5. Evaluation of different management strategies

# Integrated Ecosystem Assessments

1. Identify key issues
2. Assessment of status, indicators, and trends
3. Assessment of environmental, social, and economic causes and consequences
4. Analysis of impacts of management alternatives
5. Evaluation of management effectiveness
6. Identification of problems, data gaps, and crucial knowledge

# State of Ecosystem Service Indicators

Ability to convey information ranges from low to high

1. Fresh water use - high
2. Crop production - medium
3. Genetic resources - low

Indicators are not comprehensive

Data are often insufficient

# Ecosystem Indicators

## A. Production or Flow (Service)

1. Crops
2. Livestock
3. Fresh water

## B. Stock or Capacity (State)

1. Amount of water in the aquifer
2. Acres of forest
3. Number of fish in the lake



# Example of Drinking Water Reservoirs

Algal blooms are a key issue

Nitrogen, phosphorus, and chlorophyll a are indicators

Analysis of chlorophyll a concentrations associated with good drinking water and with algae impacted water

Analysis of nitrogen and phosphorus concentrations in algae impacted waters

Analysis of sources of nitrogen and phosphorus

Evaluation of different management alternatives and strategies

# Estuary Management

1. Nutrient management
2. Product harvest management
3. Political action
4. Citizen participation
5. Estuary productivity
6. Water quality
7. Economic, environmental, social, political, and cultural interdependence

# Ocean Ecosystems

There is a need to develop and apply science and technology to improve the ecology and productivity of ocean ecosystems for better production of food, fuel, and other products as well as for carbon sequestration.