

SUSTAINABILITY

<http://www.youtube.com/watch?v=88M118cUd0>

Definition of Sustainability

The ability of the human population to continue living as we are living for generations to come.

– We must think about all our actions by asking 3 questions.

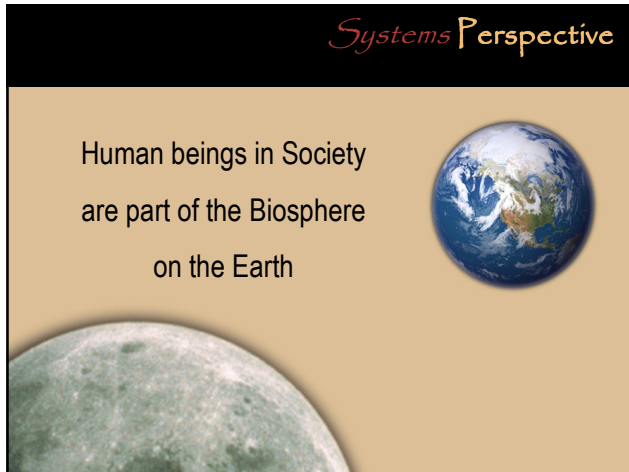
- How does it affect people?
- How does it affect the economy?
- How does it affect the environment?

– We must act responsibly.

3 Dimensions of Sustainability



Venn Diagrams



Environmental Dimension

- Live without using up resources faster than they are naturally produced.
 - food, fuel, forests, water
- Live without polluting the environment and disturbing natural processes
 - air, water soil, carbon cycle
- Live without negatively affecting the populations of all other living things.
 - maintain biodiversity

Our current situation:

life supporting resources
declining

consumption of life supporting resources
increasing

Sustainability looks different depending on the type of resource...

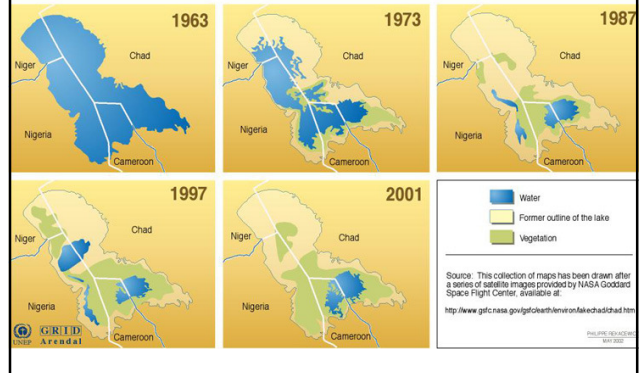
- Renewable resource: naturally regenerated
 - E.g. Forestry, fishing
 - Ideally Rate of use = or < Rate of Regeneration
- Non-renewable resource: fixed amount present in the environment and can not be regenerated
 - E.g. mining, oil and gas
 - To be sustainable it must be both
 - Economic/Social value over a long period of time
 - Cause minimal impact on ecosystems and or biosphere

Modeling Resource Use

- Strategy 1: Take it all
- E.g. a strategy for mining tar sands involves strip mining



The Disappearance of Lake Chad in Africa



When can Strategy 1 be sustainable?

- Clear cutting has a place in forestry
 - Some trees will not regenerate without full sun
 - Clear cutting is done in a patchwork pattern
 - Time scale is 100's ! of years



Strategy 2: Intensive Resource Use

- TASK
 1. Students fill one graduated cylinder full of water and measure the volume of water.
 2. With a straw they transfer water from one cylinder to the other and record the volume remaining in the 1st cylinder.
 3. Students continue this until the graduated cylinder is empty.
 4. Students graph this data

Analysis Questions

- What does the transfer of water represent?
- What happens to the amount of water you can take each time?
 - .
- Describe the type of curve we observe
- What is the end result of intensive resource use?
- Gives examples of resources that have been used in this way.

Strategy 3: Sustainable Resource Use

- 1. Students fill one graduated cylinder full of water and measure the volume of water.
- 2. Student A is given a large straw, representing resource use.
- 3. Student B is given a smaller straw, representing conservation effort.
- 4. Student A uses his straw to transfer water from cylinder 1 to cylinder 2 at the same time student B uses his straw to transfer water from cylinder 2 to 1.
- 5. At the end of each transfer students record the volume of water in the first cylinder
- 6. Students will graph their results.

Analysis Questions

- What does the transfer of water represent from cylinder 1?
- What did the transfer of water represent for cylinder 2?
- Describe the type of curve we observe
- What is the end result of intensive resource use?
- The end result illustrates the process of 'Dynamic Equilibrium'. What does this term mean?
- Describe resources that are used in this way.

Analysis Questions

- What does the transfer of water represent?
 - The transfer of water using the straw represents trapping or hunting or fishing efforts. With these activities you only take a portion of the population.
- What happens to the amount of water you can take each time?
 - Students will notice that they are able to take less and less 'volume' each time.
- Describe the type of curve we observe
 - The graph should follow a declining exponential curve.
- What is the end result of intensive resource use?
 - With continued hunting or fishing pressure the resource is eliminated or the hunter gives up because it is not worth their effort to continue.
- Gives examples of resources that have been used in this way.
 - For example: cod stocks, game birds, blue fin tuna etc.....

Analysis

- What does the transfer of water represent from cylinder 1?
 - Harvest / Use of the resource
- What did the transfer of water represent for cylinder 2?
 - Natural growth/regeneration of the population
- Describe the type of curve we observe
 - Exponential
- What is the end result of intensive resource use?
 - The overall population does not change but resource use continues
- The end result illustrates the process of 'Dynamic Equilibrium'. What does this term mean?
 - A balanced is reached but constant change occurs because opposing processes continue
- Describe resources that are used in this way.
 - All natural resources 'should' be used in this way.
 - E.g. water