Definitions, Terms and Concepts: Sustainability
Definitions, Terms and Concepts

- Try googling “sustainability” and sustainable development and counting the number of definitions.
- Is it ok that there are hundreds of definitions?
- Wikipedia 😊 😞
  - **Sustainability** is the capacity to endure. In ecology the word describes how biological systems remain diverse and productive over time. For humans it is the potential for long-term maintenance of well being, which in turn depends on the maintenance of the natural world and natural resources.
Definitions, Terms and Concepts

- Wikipedia 😊 😞

**Sustainable development** is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. The term was used by the Brundtland Commission which coined what has become the most often-quoted definition of sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."
Sustainable development...contains within it two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and

- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.
Limitations

- “...the basic behavior mode of the world system is exponential growth of population and capital, followed by collapse.” The Limits to Growth, Meadows et al., 1972.

- Carrying capacity: the upper limit to population, community size, or other geographic region, imposed through the availability of renewable and nonrenewable resources, given a rate of consumption.
Limitations

Can we use technological advances to solve the issue of dwindling or harder-to-find resources?

In the past, society has “evolved around the principle of fighting against limitations, rather than learning to live with them.” *The Limits to Growth*, Meadows et al., 1972.
The satisfaction of human needs and aspirations in the major objective of development. But the essential needs of vast numbers of people in developing countries for food, clothing, shelter, jobs - are not being met, and...these people have legitimate aspirations for an improved quality of life.

“Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life.”
“An expansion in numbers can increase the pressure on resources and slow the rise in living standards...though the issue is not merely one of population size but of the distribution of resources, sustainable development can only be pursued if demographic developments are in harmony with the changing productive potential of the ecosystem.”
Renewable Resources (Our Common Future)

- “Every ecosystem everywhere cannot be preserved intact.
  - A forest may be depleted in one part of a watershed and extended elsewhere, which is not a bad thing if the exploitation has been planned and the effects on soil erosion rates, water regimes, and genetic losses have been taken into account.”

- “In general, renewable resources...need not be depleted provided the rate of use is within the limits of regeneration and natural growth.”

- But most renewable resources are part of a complex and interlinked ecosystem, and maximum sustainable yield must be defined after taking into account system-wide effects of exploitation.
Nonrenewable Resources (Our Common Future)

- "As for non-renewable resources, like fossil fuels and minerals, their use reduces the stock available for future generations. But this does not mean that such resources should not be used."

- "In general the rate of depletion should take into account the criticality of that resource, the availability of technologies for minimizing depletion, and the likelihood of substitutes being available."
“...sustainable development must remedy social inequities and environmental damage, while maintaining a sound economic base.”

“The conservation of natural capital is essential for sustainable economic production and inter-generational equity. Market mechanisms...tend to deplete and degrade it.”

Natural capital is the stock of ecosystems that yields a flow of valuable (to humans) ecosystem goods or services.

For example, fisheries stocks provide a “flow” of new fish or fish, a flow which can be indefinitely sustainable, if managed properly.
“From an ecological perspective, population and total resource demand must be limited in scale, and the integrity of ecosystems and diversity of species must be maintained.

“Social equity, the fulfillment of basic health and educational needs, and participatory democracy are crucial elements of development, and are interrelated with environmental sustainability.”
Harris: Basic Principles of Sustainable Development – Production sectors

- **Agriculture**
  - “The need to feed an expanding population at higher per-capita levels of consumption is straining global soil and water systems…
  - On the production side, current high-input techniques which are leading to serious soil degradation and water pollution and overdraft must be replaced by organic soil rebuilding, integrated pest management, and efficient irrigation.
  - ….implying much greater reliance on local knowledge and participatory input into the development of agricultural techniques.
  - On the consumption side, both limits on population growth and greater equity and efficiency in food distribution are of central importance given probable resource limitations on production.
Energy

“Both supply limits and environmental impacts, in particular the accumulation of greenhouse gases, mean that it will be necessary to accomplish a transition away from fossil fuels well before 2050.

A non-fossil energy system would be significantly more decentralized, adapted to local conditions and taking advantage of opportunities for wind, biomass, and off-grid solar power systems.

This is unlikely to occur without a major mobilization of capital resources for renewable energy development in countries now rapidly expanding their energy systems.”
Industry

“...global industrial production increases several-fold over current levels, which themselves represent a quadrupling over 1950 levels...it is apparent that ‘end-of-pipe’ pollution control not be adequate.

...“industrial ecology” implies a goal of reducing emissions and reusing materials at all stages of the production cycle.

“...a broad cooperative effort between corporations and government will be needed to achieve goal.”
Renewable Resource Systems:

“World fisheries, forests and water systems are severely over-stressed.

...even greater demands on all systems [are] expected in the next century...institutional management must be urgently reformed.

...agreements and global funding are needed to conserve transboundary resources

...national resource management systems must...shift... from ...exploitation to conservation and sustainable harvesting

local communities must be strongly involved in resource conservation.”
Concerns and criticisms of concepts and definitions of sustainable development: *vagueness*

- the term sustainable development...means so many different things to so many different people and organizations.

- the primary debates occur between those who prefer
  - the three pillars approach: emphasizing the social, ecological and economic dimensions
  - or a more dualistic approach: emphasizing the relationship between humanity and nature
Concerns and criticisms: **vagueness**

- but the fact that there are so many definitions may be ok... “the lack of definitional precision of the term sustainable development may represent an important political opportunity.”
Concerns and criticisms: hypocrisy - fake greenery

is there “cosmetic environmentalism on the part of both government and business?” and if so, how do we deal with this?

there has been significant work to develop sustainability criteria, sustainability standards and certification for products and services
Concerns and criticisms: *sustainable development as an oxymoron*

“...there exists great uncertainty about the nature and nearness of either ecological or social limits to growth and the degree to which these can be affected by political or social changes and/or technological change.”

it appears that ... “we can design industrial systems that will use a fraction of the matter and energy throughput require to produce the same products in conventional industrial processes.
Concerns and criticisms: sustainable development as an oxymoron

- but will these more efficient designs be adopted by corporations? Can we depend on “corporate social responsibility?”
- it appears that … “we can design industrial systems that will use a fraction of the matter and energy throughput require to produce the same products in conventional industrial processes.
Concerns and criticisms: pursuing the wrong agenda

“... the rhetoric of sustainable development is about achieving sustainability for human purposes and ultimately conveys faith in the ability of humans to solve environmental and social problems through the application of reason.”

However, for those who take a biocentric view on “the appropriate relationship between humanity and nature, ... the sustainable development argument” ignores the ethical dimensions of nature.
Concerns and criticisms: *pursuing the wrong agenda*

And, on the social side, there are those that claim that “sustainable development distracts us from the real social and political changes that are required to improve human well-being, especially of the poor, in any significant way.”

“... the most fundamental critique of the concept of sustainable development...calls into question the whole trajectory of industrial society and poses the question of whether an entirely different path could be taken.”

- Embrace the lack of clear definitions and move forward:
  - there are “multiple conflicting values, moral positions and belief systems that speak to the issue of sustainability.”
  - “sustainability is itself the emergent property of a conversation about what kind of world we collectively want to live in now and in the future.”
  - “the way forward involves the development of new forms of partnership, and new tools for creating political dialogue, that frame the problems as questions of political choice, given uncertainly and constraints; that renounce the goal of precise and unambiguous definition and knowledge; and that involve many more people in the conversation.”